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THE PESTS OF THE FARM.

The Wild Cat.

The Wasp's Nest.

THE

PESTS OF THE FARM,

WITH

INSTRUCTIONS FOR THEIR EXTIRPATION:

BEING

A MANUAL OF PLAIN DIRECTIONS FOR THE CERTAIN DESTRUCTION
OF EVERY DESCRIPTION OF

VERMIN.

BIBLIOTHECA

BY H. D. RICHARDSON,

AUTHOR OF "THE HIVE AND THE HONEY-BEE," "DOMESTIC FOWL,"
"DOGS," "PIGS," ETC.

With numerous Illustrations on Wood, by W. Oldham.

SECOND THOUSAND.

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PREFACE.

THE attention of agriculturists has of late been much attracted to the very important subject of the destruction of the whole or portions of their crops, through the medium of various living creatures, who derive from their stalks, roots, or leaves, a predatory existence. Many desultory suggestions have from time to time appeared in the periodicals of the day, but nothing has as yet been brought forward in a complete and intelligible form, calculated to serve as a book of reference to the farmer or gardener, as a *key* to be consulted whenever a crop is attacked, and a *guide* calculated to point out a simple mode of destroying the enemy. To supply this deficiency is the object of the present volume; whether or not it will eventually do so remains to be seen, but it is at all events the result of personal observation and experiment, together with a collation of such observations and remarks as have from time to time been published by practical persons in the periodical press.

In order effectually to extirpate any race or tribe of animals, it is necessary in the first instance to become acquainted with their habits and mode of life. Were it desirable to destroy *horses*, it would be useless to place poison upon the tree top, or to bait a trap in the centre of a lake. This is certainly a very familiar example, but it is necessary *that we should* be equally familiar with the habits, &c., of *every pest that* we desire to destroy, as we are with tho of the horse; and many of the attempts made to destroy the former are, when canvassed by the student of nature, quite as ridiculous as those which I have described would be, if put in practice for the destruction of the latter. In pursuing this subject—one of incalculable importance, as recent agricultural losses have shewn—it is absolutely necessary that theory and practice, science and experiment, should go hand in hand, mutually aiding and supporting each other in their joint march onward to the desired goal.

A portion of the contents of the following pages was published some time since in the columns of a Scottish agricultural newspaper, and their appearance was followed by numerous applications to re-publish them in the present separate form. To this the present volume owes its introduction to the notice of the public. Should it receive as large a share of patronage as its predecessors have enjoyed and are continuing to enjoy, the author will be more than satisfied; and he will, further, have the extreme happiness of feeling that his labours have in some degree tended to alleviate misfortune, and to teach the struggling agriculturist how to battle with and overcome, nay, in some instances, as will be shewn, *convert to a source of profit*, many of those living plagues by which his labours are now in so many instances rendered almost abortive.

H. D. R.

DUBLIN, August, 1847.

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THE PESTS OF THE FARM.

ANY scientific mode of arrangement, in the treatment of such a very diversified subject as the present, would only prove a source of unnecessary toil to the author, and of mystification to the practical reader. The principal *living* pests from whose annoyances farmers, or those *holding land,* whether as farmers or mere country gentlemen, are likely to suffer, are easily divisible into three great sections—viz., quadrupeds, birds, and *insects.* I must here request permission of the *scientific* reader to adopt the latter term in its old and widest sense—viz., as applying not merely to *insecta,* but to worms, slugs, and other land molluscs infesting plants and fruits. Under the first head, of *Quadrupeds,* I shall treat of the WILD CAT, the POLECAT, the MARTIN, the STOAT, the WEASEL, the OTTER, the BADGER, the HEDGEHOG, the MOLE, the RABBIT, the HARE, the RAT, the MOUSE, and the FOX. Under the second head I shall treat of Predacious Birds, such as the eagle, the raven, the rook, the magpie, the kite, the hawk, with the numerous groups of sparrows and finches, whose predatory habits tend usually towards the same quarter, and which may to a great extent be destroyed, or their ravages guarded against, in the same manner and by the same means. Under the third, I shall treat of *Insects, properly* so called, as beetles, weevils, *wasps, flies,* the WIREWORM, the TURNIP-FLY, the BEAN-FLY, the various CATERPILLARS, and other ravenou *larvæ*, nor shall I omit some account of the celebrated *aphis vastator*, to whose devastation many persons attribute the loss of the poor man's friend—the potato; and, observe, I shall not confine my observations to such creatures as *I know* to be pests, but shall further describe such as are only *suspected*, in which case I shall give the statements that have been adduced *pro and con*—the *rook*, for instance—and shall then leave the reader to act as he pleases; and also those which are *calumniated*, which *I know not to be* pests, many of which, indeed, are on the contrary *serviceable*, and to be regarded as friends rather than as foes, to be preserved rather than extirpated.

◆

SECTION I.

QUADRUPEDS.

The Wild Cat.—A creature whose power, ferocity, and predatory habits, have procured for it the formidable and unenviable title of "British Tiger," and one which, in certain districts, does very extensive mischief, as well to the ordinary descriptions of live stock, which are valuable to the mere farmer, as to those creatures, which, being the peculiar *quarries* of the sporting country gentleman, are to him no less objects of solicitude. In form, the Wild Cat closely resembles its domesticated namesake; it is, however, more compactly built, is of larger size, and its tail is not only shorter, but blunter at the point. From the latter circumstance has arisen the not yet obsolete fable of wild, demon-like cats, being found, with *hooks* or *spikes* at the extremity of the tail; for, in the common Wild Cat, the extremity of the tail is usually destitute of hair, and is not unfrequently furnished with a hard and nail-like process, proceeding from a sort of unaccountable exposure of the last joint of the tail. The domestic cat will also occasionally become wild. This is not, as might be supposed, the descendant of the Wild Cat, but is of Egyptian origin. It will, however, breed with the Wild Cat, and I have ascertained that the progeny are fertile. The young are also fertile among themselves; and, hence, according to the admitted theory of zoologists, they are of the *one species*.

When the domestic cat becomes wild, it is, by many degrees, a more troublesome and more crafty enemy than the naturally wild animal. Whether naturally wild, or only having been rendered so by circumstances, however, both animals present the same characteristics of disposition, habit, and place of abode. Their prey is the same, their habitudes are the same, and, consequently, the same mode of destruction will be found to apply to both. The principal specific difference between the Wild and the common cat is the length of the intestines—those of the Wild Cat being considerably shorter.

Maxwell, in his "Wild Sports of the West," alludes to the circumstance of the common cat, thus become wild, forming its habitation in the rabbit-burrows on the sea-coast—"Some estimate of their numbers," quoth he, "may be formed, from the circumstance of five males having been killed in a herdsman's outhouse, adjoining the warren. They had been attracted there by one of their own species, and the noise having alarmed the peasant, he guessed the cause, and cautiously managed to stop the hole by which they gained entrance, with a *turf cleaver*. Knowing the value of the capture, he kept guard upon the premises till the morning, and then despatched information to the lodge. My cousin, with his followers, promptly repaired to the place, and surrounding the barn, with guns and greyhounds, bolted the wild cats successively, until the whole number were despatched. This chasse was not only novel but profitable. After the death of their persecutors, the rabbits increased prodigiously, but fears are entertain that these destructive animals are become once more abundant in the sand banks."

The Wild Cat exceeds the common cat in size, standing usually upwards of eighteen inches in height. The body is shorter in proportion; the lips are always black, and the prevailing colour of the fur a rusty grey. This fur will be found to make an excellent keeper's cap, or a warm and comfortable lining for winter shoes.

Now, as to the destruction of the cat, either traps or poison will effect it with facility. A steel spring-trap is best, and I prefer the square to the round form. Chain it firmly to some fixed object; bait with a dead fowl or piece of meat, smeared or rubbed with *valerian*. The cat is so very fond of the odour of this substance, hence familiarly termed "cat-mint," that it will go anywhere for the purpose of rolling upon it. The annexed cut represents the best form of trap for this purpose. You should proceed with caution to release the captive felon. An infuriated Wild Cat is no trifling antagonist, and you had better, therefore, put the creature out of pain, by sending a bullet through its head, before you meddle with it. Should any blood be spilled upon the trap, wash it off, and change

the bait every night. I object to poison, unless where no traps can be made available, as not unfrequently some unfortunate dog, or, haply, some poor innocent little child, falls the victim.

The Polecat.—Although the name of this animal is apparently a compound of that of the animal last described, no two creatures could be much more dissimilar. The Polecat resembles closely the common ferret, but is larger, of a dark chocolate colour, mingled with yellow, on the back and sides, and black upon the under surfaces. It differs also from the ferret in some few anatomical details. It has, for instance, but fourteen ribs, while the ferret possesses fifteen, and it wants a bone proper to the formati of the throat, that the ferret also possesses. The two animals are not, however, specifically distinct, for they breed together freely, and the offspring are fertile among themselves. A Polecat in your neighbourhood is one of the most destructive foes you could possess. Its thirst for blood is truly insatiable; and when it has once obtained access to your hen-roost or rabbit-warren, it will continue to slay, nor pause to devour one of its victims, until all are first dead: in fact, it kills without reference to the calls of hunger—it slays purely from a love of destruction. The principal victims of the Polecat are the poultry, including ducks and geese—it will even steal upon turkeys. Nor are we to omit the dove-cot, which it will depopulate in a single night; nor the *game*, for it will surprise the hare upon her form; exterminate the rabbits in your warren; pounce upon the partridge in her nest, the pheasant on its roost. In winter, it will attack and plunder *bee-hives*. Nor is this all. Your young lambs, at yeaning time, not unfrequently add to the number of its victims, and of your losses.

There are farmers who anxiously encourage the Polecat to take up its abode with them, in order to have the advantage of its valuable assistance in ridding them of rats; but they may rest assured that they lose far more than they gain. The Polecat is, therefore, a foe, and his destruction is consequently not merely legitimate but advisable. This is to be effected in several ways, but a moonlight chase affords most diversion. For this purpose the hole is sought, and at nightfall—the period when the Polecat goes forth on its career of slaughter—it is carefully stopped up, two or three good terriers are laid on its track, and the chase commences. The enemy is run into and killed; or if he has been run to earth, he is dug out and thrown to the dogs, who speedily finish him. The steel-trap is, however, *far the most certain* method. The best bait is red herring, *half broiled*. The Polecat is so very fond of this scent, that he flies to it the moment his nose feels its impression, and rushes blindly on his destruction; and the same scent which allures him has a precisely contrary effect on hares, which dislike it, and are thus prevented from approaching the traps. The same form of trap recommended for the wild cat will answer, but it should be of smaller size. Box-traps have been recommended; but I have little confidence in them, and prefer the steel. A few leaves or grass should be cast over the trap, in order to disguise its character. The Polecat is not a very sagacious animal, however, and his extreme greediness, added to his want of cunning, render his capture, by the preceding method, very easy. If a box-trap be used at all, let it be a long one, open at both ends; place it in a narrow ditch or drain; cast bushes over it; bait as before, with half-broiled red herring, and trail the bait for some distance along the ditch at both extremities of the trap. The fur of the Polecat is of beautiful texture, and would be nearly as valuable as sable, but for the difficulty attendant upon the removal of the very disagreeable odour attached to it. I have found *musk* only to aggravate it, and am not prepared to say that any mode of treatment will effectually remove it. *Chlorine gas*, prepared by pouring sulphuric acid upon chloride of lime, is the best remedy I have yet been able to discover.

The Martin is larger than the polecat, of a bay or light brown color, and remarkable elegance of form. It has been pronounced to be at once the most beautiful and most destructive of British beasts of prey. This animal is an agile climber of trees, and is on that account a terrible foe to the pheasant. Unlike the polecat, the Martin offers no compensation whatever for the ravages it commits. It greedily devours the poultry, game, young lambs, *pigeons*, and other descriptions of farming stock, while at *the same* time it will neither touch rats nor mice. It wi however, kill cats, and even the wild cat; but in so doing, it only destroys an enemy if anything even less destructive than itself. The boon conferred is, therefore, to say the least, questionable. To destroy the Martin, traps chained in the forks of trees will be found useful, baited with a dead pigeon, and feathers strewed over it; but by far the most certain mode of catching them is the following:—The Martin is a very cleanly animal, and unwilling to have its fur wet or soiled. It is therefore in the habit, when wet with dew, after a night's marauding, of rubbing itself dry against the pales or posts of a park paling. In some or several of these posts or pales, grooves should be cut, and a steel trap, *without a bait*, chained thereto. The animal rubbing against the trap, will certainly be caught. Another mode is that recommended for the polecat—setting a long box-trap in a ditch or hollow, open at both ends, and the bait in the middle. It is said that a very moderate use of musk will entice the animal to enter. The fronts of these boxes should be painted *white*, which will deter hares from approaching them. A dead rabbit, if in the neighbourhood of a warren, forms a good bait, and it may be opened previous to attaching it to the trap. The party employing the trap should be very cautious as to his manner of removing his captured enemy. If it be a *wild cat*, which often gets caught in the Martin traps, it will fly in the face of the person who opens the trap, and probably inflict serious injury. The safest mode of proceeding is, therefore, to envelop one end of the trap in a bag, and by striking the opposite end, the creature, whatever it be, will be bolted into it. It may then be despatched at leisure. The fur of the Martin is valuable.

THE STOAT is a small animal, resembling the weasel in general form, but somewhat larger, and more robust. It *is usually confounded* with that animal, but may readily be *distinguished by the* circumstance of its possessing a black *tip* to the extremity of its tail. In the more northern parts of Europe, the Stoat becomes white in winter; it is then

called the *Ermine*, but whatever be the general change of colour, the tip of the tail remains black. I have shot Ermines in Scotland, both white and pied. The fur is of some value, but inferior to that which comes from Siberia. The Stoat is very destructive of poultry, pigeons, and game; not even all the speed of the hare can preserve her from this pertinacious little enemy, as the following anecdote will testify.

Some years ago, as a gentleman was walking through the forest of Bere, to visit a friend, he observed a hare to come into the green lane before him, which appeared to be listening and looking back for something which pursued her. He stood still, and, having no dog, was curious to discover the cause of her alarm; when, to his great surprise, he discovered the object of it to be a small red and white Stoat, which hunted her footsteps with the utmost precision. The gentleman, anxious to discover whether so diminutive an animal would have a chance of coping with the great speed and strength of the hare, retreated behind some bushes, where he was an attentive observer of this silent hunt for nearly two hours, during which he is certain that he saw the Stoat and hare at least forty times. They were frequently gone for five or ten minutes; but the hare, still unwilling to leave the place where she was found, came round again, and her little pursuer sometimes close at her heels. Towards the end of this remarkable chase, which became uncommonly interesting, the hare took advantage of the thickest covert which the place afforded, and made use of all her cunning and strength to escape, but without effect: till at length, wearied out by the perseverance of the Stoat, the gentleman heard her cry for some time. At last, the cries coming from one point, he concluded that the hare had become the victim of the chase; on which he went to the spot, where he found the hare quite dead, and the Stoat so intently fastened on her neck that it did not perceive his approach. The Stoat now in his turn fell a victim to the superiority of man: the gentleman's stick speedily decided its destiny, after which he, with both hare and Stoat, proceeded on his way to the house of his friend.

To take these pests, use such square steel straps, as I have already described, but smaller; bait with small birds, their tails dipped in *musk;* the Stoat displaying as strong a predilection for this substance as the cat does for valerian.

THE WEASEL is somewhat less than the stoat, yellowish brown above, and white beneath; tail very short, the extremity of which is *never* black. If a Weasel could be confined to a granary, he would prove a valuable ally to the farmer, as the rats and mice have no more determined enemy; but unfortunately this little animal is a serious foe to pigeons, partridges, poultry, nor has the hare a more fatal adversary. The Weasel is very ferocious, and is possessed of extraordinary courage and power, for so diminu*tive an animal.* Instances have been recorded of their *attacking man,* and being almost the conqueror. Three

Weasels are said to be an overmatch for a good dog. An anecdote is related of a Weasel having been seized by an eagle, and carried by the bird into the air. The courageous little animal did not, however, abandon itself to despair; but, contriving to disengage itself so far as to fasten upon the eagle's throat, presently brought its enemy to the ground, and so escaped. It may be taken in the same manner, and by the same description of trap that I have recommended for taking the martin, observing only to mingle a very small portion of aniseed with the musk with which the trap is baited.

The Badger.—I must here devote a few passing words to an unfortunate animal, most unjustly made the victim of much calumny and consequent persecution—the Badger, or, as he is sometimes provincially termed, the *Brock.*

Of all the animals with which man has become acquainted, and over which he has succeeded in establishing his dominion, none has had greater cause to deprecate his tyranny, and to exclaim, had it the gift of speech, against his wanton barbarity, than the unfortunate creature whose simple and unoffending habits I have now selected for description.

With the appearance and form of this animal most of my readers are, doubtless, tolerably acquainted, as it is a pretty common inhabitant of this country, and would be still more abundant, were not its numbers checked by that barbarous and brutal amusement—badger-baiting—to which, despite the interference of the laws, hundreds yearly fall victims. In general appearance, as well as internal structure, the Badger approximates closely to the bear, and may, I think not unaptly, be regarded as the existing representative of that once formidable denizen of the wilds of our native land. Like the bear, the Badger walks upon his heels; and his legs being very short, and his hair remarkably thick and long, his belly appears almost to touch the ground. A little observation is, however, sufficient to show that it does not actually do so. He is a nocturnal animal—that is to say, he sleeps during the day, and at the approach of evening leaves his habitation in search of food. Yet nocturnal though his habits, and however closely he may in that respect resemble the predacious tribes, the food of the Badger is of such a description that its appropriation injures no one, but is, on the contrary, productive of great benefit to the agriculturist, consisting as it does chiefly, if not solely, of roots and reptiles, as frogs, worms, grubs, beetles, &c. The Badger, as far as I have been able to discover, lives affectionately with his one mate and little ones in his secluded burrow, and in his deportment to them displays feelings of ardent devotion and disinterested attachment, which many of this poor creature's biped persecutors would do well to imitate.

The common Badger is about as large as a middle-sized dog, from two feet to two feet and a-half in length, exclusive of the tail, and about a foot or fifteen inches high. He weighs from twenty to thirty-five pounds, sometimes even more. I saw a Badger in Edinburgh, about twelve years ago, which weighed forty-seven pounds; such a size is, however, very rarely attained. In coat, the Badger presents a remarkable peculiarity. Among nearly all mammiferous animals, the back or *dorsal* region of the body is of a darker or deeper colour than the under parts, or ventral region. The colour of the Badger is, on the contrary, greyish above and black underneath. The fur of the Badger is thick, rough, and by no means glossy; the skin, with the hair on, is dressed and manufactured into pistol-cases. The skin on the head and face may be frequently seen forming the "*sporran*" or purse which depends from the girdle of the Scottish Highlander; and the hairs of the tail are in great request for the manufacture of paint and lather brushes. The Badger is an inhabitant of all the temperate parts of

Europe and Asia. In Great Britain and France it is scarcer, from the assiduity with which it is hunted and destroyed. Doctor Richardson has identified various new species in his account of the zoology of the arctic regions. As the object of the present pages is, however, a sketch of the European animal, I shall not notice any other at present, but merely refer such of my friends as may feel curious on the subject to Doctor Richardson's splendid work entitled "Fauna Borealis Americana."

In his internal conformation, the Badger presents two remarkable features—namely, in the first place, a peculiar formation of jaws, which not merely enables him to retain a firm hold of whatever object he seizes with his teeth, but absolutely *lock* in such a manner that he himself does not always possess the power of instantaneously unclosing them; and, secondly, a pouch or bag placed in the neighbourhood of the tail, whence exudes a thick and fetid substance. It is upon this that the strong smell given forth by this animal depends.

I once had a Badger in my own possession, and the study of his habits afforded me much interest and gratification. He was more than half-grown when I obtained possession of him, and I can assure my readers that the task of taming him was no sinecure. The first agent I employed for effecting his domestication was hunger. I kept him fasting for three whole days, allowing him only a little water in his bowl, which humanity would not suffer me to deny him. Starvation, however, did not produce any immediate good effects, and the animal remained as fierce and irreconcilable as ever. It would but needlessly occupy the reader's time were I minutely to recount the process of taming him; let it suffice to refer to my papers in the "Irish Penny Journal" on the taming of animals. I followed the rules therein laid down, and I had the satisfaction of finding *them ultimately* successful, after from six to eight months of anxious care, enlivened occasionally by the variety of a severe bite, a casualty for which every practical zoologist must be prepared, and at which it would be ridiculous for him to grumble.

After about eight months, however, he gave up his practice of constantly biting when attempted to be handled, unless under great provocation or excitement, and was not merely so gentle as to be with safety indulged with partial liberty, but would come and go when I called him or drove him from me, would feed from my hand or mount upon my knee, and was, moreover, soon afterwards entrusted with entire liberty, without any danger of his running away. He was a very cleanly creature, carefully scraping into one end of his cage whatever unpleasant matters might collect in it, and he always contrived as much as possible to keep his bed free of soil. Finding him so remarkably cleanly, I used to let him out morning and evening, on such days as my absence from home obliged me to keep him in a state of confinement during the daytime.

I did not, of course, give him his liberty all at once; but according as he grew tame I used to let him out in a room or enclosed yard, according to the state of the weather, for an hour or two daily, and did not give him his liberty altogether until his increased tameness gave me confidence in his thorough domestication.. This creature's diet consisted of bread and milk, varied with oatmeal porridge or *stirabout*, and potatoes boiled soft and bruised down fine with milk, with occasionally a bit of raw meat. He was singularly nice respecting his meat; indeed I suspect rather from the effects of good living in his easy state of captivity, than from an impulse of nature; for had a piece of meat once, and that no matter how slightly, touched the fire, he would on no account touch it, unless indeed when very hungry, and no raw flesh to be had. Milk he appeared *very fond of, and* would drink freely; potatoes, especially if mashed up with butter or milk, he would always dine heartily off; but, which not a little surprised me, I frequently observed him devouring them raw, and that too in the absence of hunger, and while surrounded with what might naturally be supposed to be more palatable food. He had a very strong and by no means very agreeable smell. I had an old terrier named "Wasp," who had been a good dog in his day, but, weighed down by a load of years, was fast hurrying onward towards the grave. Wasp's teeth had failed him, his eyes had become dim, his clogged and tattered ears scarcely informed him when I called his name; yet his fondness for sport still remained, and he would lie for hours each day at the door of the little yard in which the Badger was confined, as if resolved that, though his powers no longer admitted of his discovering and attacking his enemy, yet he would, while he could, inhale the (to him) delightful odour of his favourite game.

My Badger passed nearly the whole of his days in sleep, and if I attempted to disturb him, he would be sulky and peevish, and in no humour for play. When evening drew near, however, he might be seen first stirring, then opening his eyes and stretching himself, with many a long and hearty yawn. The process of thoroughly awaking himself usually occupied about twenty minutes, commencing with the decline of day, and terminating with the arrival of darkness. The beginning of night usually found him regularly astir; he was then restless and active, pacing to and fro, examining every nook and cranny, climbing upon everything upon which he was able to mount, and seizing, if out of doors, upon worms, beetles, cockchafers, and snails, and if within, seeking for drowsy flies upon the walls, or for beetles or crickets about the kitchen hearth, or in the cellars when he could obtain access to them.

Many naturalists hold the opinion that the Badger sleeps *during the winter*, or at all events hibernates partially—that is to say, sleeps, like the squirrel, for a few weeks, awakes, and takes a hearty meal of the store of food it had sagaciously laid by in its nest ere retiring to winter quarters, and then, coiling itself up in its nest, goes off to sleep again. Whether this be true or not, I cannot with certainty affirm; but this I can safely declare, that I endeavoured as much as possible to make my Badger hibernate, by exposing him to the unmitigated cold of an unusually severe winter, by furnishing him with straw and wool to line his nest, and with a stock of bread, snails, and potatoes, to lay up for winter use. He did not, however, avail himself of my assistance, but remained wakeful as usual during the entire winter. A remarkable fact worthy of notice here is, that although this Badger exhibited no inclination to hibernate or sleep during the winter, he did display considerable disposition to æstivate, or sleep during the hot months of summer, for during that season he became languid and drowsy, lost his appetite and flesh, became ragged and foul in the coat, and in short pined away so rapidly that I feared I should lose him altogether; he, however, revived completely, as winter, and that a cold one, approached.

I made diligent inquiry of those who were in the habit of keeping badgers for baiting them, and also of the proprietors of several menageries, and learned from them that this disposition on the part of the Badger to become weak and lose its condition in summer, is not confined to isolated individual cases, but is common to the entire tribe.

It is truly astonishing to observe with what quickness and despatch the Badger forms a burrow, for which task indeed he is admirably adapted by nature, in the construction of his anterior extremities. To give my readers some idea of these powers, I shall conclude the present sketch with *the following* anecdote of the individual formerly in my *possession :*

Wishing to increase the happiness of my pet, I procured a female of his own species to keep him company, and while preparing a large enclosure for their reception, I shut them both up in an outhouse: I do not think I was half an hour absent, when on my return I found my new badger gone. A moment's investigation discovered the place of her concealment; the animal had, during my short absence, formed a considerable burrow under the wall of the outhouse, which, I must observe, was built against a bank forming the side of the road. It was into that bank that the creature had worked its way, and on listening I could hear it delving and scraping at a prodigious rate, about a yard from the back of the wall. I hastily procured the assistance of a mason, who pulled down part of the wall, and by working rapidly, succeeded in overtaking the Badger just as she had worked her way across the road to within a foot of the Edinburgh Botanic Garden wall, beside which I lived. I may observe that the ground was by no means soft, the burrow being formed under a hard although not macadamized road.

The Badger, indeed, is rather to be regarded as a friend than as a foe, and least of all as a pest; and I trust that the foregoing remarks will cause him for the future to be protected rather than persecuted by the judicious farmer.

The Common Otter varies in size—some adult specimens measuring no more than thirty-six inches in length, tail inclusive; while others, again, are to be found from four and a-half to five feet long. The head of the otter is broad and flat; its muzzle is broad, rounded, and blunt; its eyes small and of a semicircular form; neck extremely thick—nearly as thick as the body, which is long, rounded, and very flexible; legs short and muscular; feet furnished with five sharp clawed toes, webbed to three-quarters of their extent; tail long, muscular, somewhat flattened, and tapering to its extremity. The colour of the otter is a deep blackish brown; the sides of the head, the front of the neck, and sometimes the breast, brownish grey. The belly is usually, but not invariably, darker than the back ; the fur is short, and of two kinds; the inferior or woolly coat is exceedingly fine and close; the longer hairs are soft and glossy, those on the tail rather stiff and bristly. On either side of the nose, and just below the chin, are two small light-coloured spots. So much for the appearance of the otter: we now come to its dwelling. The otter is common to England, Ireland, and Scotland; a marine variety is also to be met with, differing from the common only in its superior size and more furry coat. Some naturalists have set them down as a different species: I am, however, disposed to regard them merely as varieties.

The native haunt of the otter is the river bank, where, amongst the reeds and sedge, it forms a deep burrow, in which it brings forth and rears its young. Its principal food is fish, which it catches with singular dexterity. It lives almost wholly in the water, and seldom leaves it except to devour its prey; on land it does not usually remain long at any one time, and the slightest alarm is sufficient to cause it to plunge into the stream. Yet, natural as seems a watery residence to this creature, its burrow is perfectly dry; were it to become otherwise, it would be quickly abandoned. The entrance, indeed, is invariably under water, but its course then points upwards into the bank, towards the surface of the earth, and it is even provided with several lodges or apartments at different heights, into which it may retire in case of floods, throwing up the earth behind it as it proceeds into the recesses of its retreat; and when it has reached the last and most secure chamber, it opens a small hole in the roof for the admission of atmospheric air, without which the animal could not of course exist many minutes; and should the flood rise so high as to burst into *this last place of* refuge, the animal will open a passage *through the roof,* and venture forth upon land, rather than remain in a damp and muddy bed. During severe floods, otters are not unfrequently surprised at some distance from the water, and taken.

In a wild state, the otter is fierce and daring—will make a determined resistance when attacked by dogs—and being endued with no inconsiderable strength of jaw, it often punishes its assailants terribly. I have myself seen it break the fore-leg of a stout terrier. Otter-hunting was in former times a favourite amusement even with the nobility, and regular establishments of otter-hounds were kept. The animal is now become scarce, and its pursuit is no longer numbered in our lists of sports, unless perhaps in Scotland, where, especially in the Western Islands, otter-hunting is still extensively practised.

The otter is easily rendered tame, especially if taken young, and may be taught to follow its master like a dog, and even to fish for him, cheerfully resigning its prey when taken, and dashing into the water in search of more. A man named James Campbell, residing near Inverness, had one which followed him wherever he went, unless confined, and would answer to its name. When apprehensive of danger from dogs, it sought the protection of its master, and would endeavour to spring into his arms for greater security. It was frequently employed in catching fish, and would sometimes take eight or ten salmon in a day. If not prevented, it always attempted to break the fish behind the fin which is next the tail; and as soon as one was taken away, it always dived in pursuit of more. It was equally dextrous at sea-fishing, and took great numbers of young cod and other fish. When tired, it would refuse to fish any longer, and was then rewarded with as much food as it could devour. Having satiated its appetite, it always coiled itself up and went to sleep, no matter where it was, in which state it was usually carried home.

Brown relates that a person who kept a tame otter taught it to associate with his dogs, who were on the most friendly terms with it on all occasions, and that it would follow its master in company with its canine friends. This person was in the habit of fishing the river with nets, on which occasions the otter proved highly useful to him, by going into the water and driving trout and other fish towards the net. It was very remarkable that dogs accustomed to otter-hunting were so far from offering it the least molestation, that they would not even hunt any other otter while it remained with them; on which account its owner was forced to part with it.

The otter is of a most affectionate disposition, as may at once be seen from its anxiety respecting its young. Indeed, the parental affection of this creature is so powerful, that the female otter will often suffer herself to be killed rather than desert her whelps. Professor Steller says—"Often have I spared the lives of the female otters whose young ones I took away. They expressed their sorrow by crying like human beings, and following me as I was carrying off their young, while they called to them for aid with a tone of voice which very much resembled the crying of children. When I sat down in the snow, they came quite close to me, and attempted to carry off their young. On one occasion, when I had deprived an otter of her progeny, I returned to the place eight days after, and found the female sitting by the river listless and desponding; she suffered me to kill her on the spot without making any attempt to escape. On skinning her I found she was quite wasted away from sorrow for the loss of her young." This affection which the otter, while in a state of nature, displays towards her young, is, when in captivity, usually transferred to her master, or perhaps, as in an instance I shall mention by-and-bye, to some one or other of his domestic animals. As an example of the former case I may mention the following:—A person named Collins, who lived near Wooler, in Northumberland, had a tame otter, which followed him wherever he went. He frequently took it to the river to fish for its own food, and when satisfied it never failed to return to its master. One day, in the absence of Collins, the otter being taken out to fish by his son, instead of returning as usual, refused to answer to the accustomed call, and was lost. Collins tried every means to recover it; and after several days' search, being near the place where his son had lost it, and calling its name, to his very great joy the animal came crawling to his feet. In the following passage of the "Prædium Rusticum" of Vaniere, allusion is made to tame otters employed in fishing:—

> "Should chance within this dark recess betray
> The tender young, bear quick the prize away;
> Tamed by thy care the useful brood shall join
> The watery chase, and add their toils to thine;
> From each close lurking hole shall force away,
> And drive within the nets the silver prey;
> As the taught hound the nimble stag subdues,
> And o'er the dewy plain the panting hare pursues."

Mr. Macgillivray, in his interesting volume on British Quadrupeds, in the "Naturalist's Library," mentions several instances of otters having been tamed and employed in fishing. Among others he relates that a gentleman residing in the Outer Hebrides had one that supplied itself with food, and regularly returned to the house. M'Diarmid, in his "Sketches from Nature," enumerates many others. One otter belonging to a poor widow, "when led forth plunged into the Urr, and brought out all the fish it could find." Another, kept at Corsbie House, Wigtonshire, "evinced a great fondness for gooseberries," fondled "about her keeper's feet like a pup or kitten, and even seemed inclined to salute her cheek, when permitted to carry her freedoms so far." A third, belonging to Mr. Monteith, of Carstairs, "*though he* frequently stole away at night to fish by the *pale light of* the moon, and associate with his kindred b *the river side,* his master of course was too generous to any fault with his peculiar mode of spending his evening hours. In the morning he was always at his post in the kennel, and no animal understood better the secret of 'keeping his own side of the house.' Indeed his pugnacity in this respect gave him a great lift in the favour of the gamekeeper, who talked of his feats wherever he went, and averred besides, that if the best cur that ever ran 'only daured to girn' at his *protegé*, he would soon 'mak his teeth meet through him.' To mankind, however, he was much more civil, and allowed himself to be gently lifted by the tail, though he objected to any interference with his snout, which is probably with him the seat of honour."

Mr. Glennon, of Suffolk-street, Dublin, informs me that Mr. Murray, gamekeeper to his Grâce the Duke of Leinster, had, some years ago, a tame otter, which entered the water to fish when desired, and laid whatever he caught with due submission at his master's feet. Mr. Glennon further observes, that the affection for his owner which this animal exhibited, was equal or even superior to that of the most faithful dog. The creature followed him wherever he went, would suffer him to lift him up by the tail and carry him under his arm just as good-humouredly as would a dog, would spring to his knee when he sat at home, and seemed in fact never happy but when in his company. This otter was well able to take care of himself, and fearlessly repelled the impertinent advances of the dogs: with such, however, as treated him with fitting respect, he was on excellent terms. Sometimes Mr. Murray would hide himself from the animal, which would immediately, on being set at liberty, search for him with the greatest anxiety, running like a terrier dog by the scent. Mr. Glennon assures me that he has frequently seen the animal thus trace the footsteps of its master for a considerable distance across several fields, and that too with such precision as never in any instance to fail of finding him.

I myself had once a tame otter, with a detail of whose habits and manners I shall now conclude this account. When I first obtained the animal she was very young, and not more than sixteen inches in length; young as she was, she was very fierce, and would bite viciously if any one put his hand near the nest of straw in which she was kept. As she grew a little older, however, she became more familiarized to the approaches of human beings, and would suffer herself to be gently stroked upon the back or head; when tired of being caressed, she would growl in a peculiar manner, and presently use her sharp teeth if the warning to let her alone was not attended to. In one respect the manners of this animal presented a striking contrast to the accounts I had read and heard of other tame individuals. She evinced no particular affection for me; she grew tame certainly, but her tameness was rather of a general than of an exclusive character. Unlike other wild animals, which I had at different times succeeded in domesticating, this creature testified no particular gratitude to her master; and whoever fed her, or set her at liberty, was her favourite for the time being. She preferred fish to any other diet, and eagerly devoured all descriptions, whether taken in fresh or salt water, though she certainly preferred the former. She would seize the fish between her fore-paws, hold it firmly on the ground, and devour it downwards to the tail, which, with the head, the dainty animal rejected. When fish could not be procured, she would eat, but sparingly, of bread and milk, as well as the lean of raw meat; fat she could on no account be prevailed upon to touch.

Towards other animals my otter for a long period maintained an appearance of perfect indifference. If a dog approached her suddenly, she would utter a sharp, whistling noise, and betake herself to some place of safety: if pursued, she would turn and show fight. If the dog exhibited no symptoms of hostility, she would presently return to h place at the fireside, where she would lie basking for hours at a time.

When I first obtained this animal, there was no water sufficiently near to where I lived in which I could give her an occasional bath; and being apprehensive, that, if entirely deprived of an element in which nature had designed her to pass so considerable a portion of her existence, she would languish and die, I allowed her a tub as a substitute for her native river; and in this she plunged and swam with much apparent delight. It was in this manner that I became acquainted with the curious fact, that the otter, when passing along beneath the surface of the water, does not usually accomplish its object by swimming, but by walking along the bottom, which it can do as securely and with as much rapidity as it can run on dry land.

After having had my otter about a year, I changed my residence to another quarter of the town, where a stream flowed past the rere of the house. The creature being by this time so tame as to be allowed perfect liberty, I took it down one evening to the river, and permitted it to disport itself for the first time since its capture in a deep and open stream. The animal was delighted with the new and refreshing enjoyment, and I found that a daily swim in the river greatly conduced to its health and happiness. I would sometimes walk for nearly a mile along the bank, and the happy and frolicsome creature would accompany me by water, and that too so rapidly that I could not even by very smart walking keep pace with it. On some occasions it caught small fish, such as minnows, eels, and occasionally a trout of inconsiderable size. When it was only a minnow or a small eel which it caught, it would devour it in the water, putting its head for that purpose above the surface: when, however, it had made a trout its prey, it would come to shore, and devour it more at leisure. I strove very assi duously to train this otter to fish for me, as I had heard they have sometimes been taught to do; but I never could succeed in this attempt, nor could I even prevail upon the animal to give me up at any time the fish which she had taken: the moment I approached her to do so, as if suspecting my intention, she would at once take to the water, and, cróssing to the other side of the stream, devour her prey in security. This difficulty in training I impute to the animal's want of an individual affection for me—for it was not affection, but her own pleasure, which induced her to follow me down the stream; and she would with equal willingness follow any other person who happened to release her from her box. This absence of affection was probably nothing more than peculiarity of disposition in this individual, there being numerous instances of a contrary nature upon record.

Although this otter failed to exhibit those affectionate traits of character which have displayed themselves in other individuals of her tribe towards the human species, she was by no means of a cold or unsocial disposition towards some of my smaller domestic animals. With an Angora cat she soon after I got her formed a very close friendship, and when in the house was unhappy when not in the company of her friend. I had one day an opportunity of witnessing a singular display of attachment on the part of this otter towards the cat:—A little terrier dog attacked the latter as she lay by the fire, and driving her thence, pursued her under the table, where she stood on her defence, spitting and setting up her back in defiance: at this instant the otter entered the apartment, and no sooner did she perceive what was going on, than she flew with much fury and bitterness upon the dog, seized him by the face with her teeth, and would doubtless have inflicted a severe chastisement upon him, had I not hastened to the rescue, and, separating the combatants, expelled the terrier from the room

When permitted to wander in the garden, this otter would search for grubs, worms, and snails, which she would eat with much apparent relish, detaching the latter from their shell with surprising quickness and dexterity. She would likewise mount upon the chairs at the window, and catch and eat flies—a practice that I have not hitherto seen noticed by any naturalist.

The common otter is only to be regarded as a pest when fish-ponds or rivers are concerned. His habits are interesting, and of a gentle and inoffensive description, and his race is not so numerous as to require or deserve extirpation.

THE HEDGEHOG has been ably defended by several eloquent naturalists, who would fain vindicate its character from the aspersions which farmers have, from time to time, endeavoured to cast upon it; and perhaps it is at least doubtful whether or not they do perform services to a greater amount than they perpetrate mischief. Let us consider the actual state of the case. The hedgehog is *unjustly* accused of sucking cows, when lying out in the fields, but there is no manner of question of the havoc they commit among the eggs of game. Mr. Jesse relates the following:—During the summer of 1818, as Mr. Lane, gamekeeper to the Earl of Galloway, was passing by the wood of Glascader, near Garlieston, in Scotland he fell in with a hedgehog, crossing the road at a small distance before him, carrying on its back six *pheasant eggs*, which, upon examination, he found it had pilfered from a pheasant's nest hard by. The ingenuity of the creature was very conspicuous, as several of the remaining eggs were *holed*, which must have been done by it when in the act of rolling itself over the nest, in order to make as many adhere to its prickles as possible. After watching the animal's motions for some time longer, Mr. Lane saw it deliberately *crawl into a furze bush*, where its nest was, and where the *shells of several eggs* were strewed about, which had at some former period been conveyed thither in the same manner. On the other hand, the hedgehog destroys a very troublesome *weed*, viz., the *plaintain*, beneath which it burrows, and devours the root upwards to the leaves, than which there could hardly be devised a more certain method of extirpation; it likewise devours *beetles*, *snails*, *slugs*, *frogs*, and *field mice*, all so many serious and unmistakeable pests. It remains a question, therefore, and one that I gladly submit to the individual judgment of intelligent agriculturists, how far this little creature should not also be taken, as I have recommended in the case of the badger, under their protection, and preserved instead of being hunted and destroyed.

THE MOLE.—The Mole is, by most agriculturists, ranked among the most troublesome pests of their farm; while others again deny that it deserves this bad character, and are even disposed to expatiate on its utility. It is certain that the Mole is of strictly carnivorous, nay, I should perhaps say, of insectivorous habits—its food consisting chiefly of worms, slugs, snails, beetles, cockchafers, grubs, and other such creatures. In destroying these there can be no doubt but that the Mole does good service to the *farmer, and deserves* so far to be looked on with some degree *of favour*. On the other hand, however, it is no les

true that in forming its burrow, the mole throws up a heap of earth, known as a molehill, which is apt to interfere with the progress of the mowers. Some say that the holes also are serviceable to the soil, by throwing up the subsoil, and thus renewing the surface, but it must be at the same time admitted that this burrowing loosens and often disinters the roots of grain. Whether, therefore, this animal is to be regarded as a pest or not, depends on the opinion of the individual farmer on whose lands he may make his appearance. My duty consists merely in pointing out the most efficacious method of destroying the animal: those farmers who think he should be rather protected than warred against, are not obliged to use the means I merely place within their reach. I may observe, that the Mole does not exist in Ireland.

Few dogs will kill or even mouth the Mole, and if a dead one be presented to a dog, he will usually curl up his lips, and turn from it in apparent disgust. I have heard this asserted of cats also, but am not positive of the correctness of the idea, never having myself made the experiment. Traps and poison are the means best calculated to effect their extirpation. The ordinary mole-trap is to be obtained from any of the agricultural implement makers, or any of the farm seed-shops. The principle of its construction depends on a spring formed of some elastic sort of twig, stuck in the ground, and bent until its other extremity is attached to the trap. The trap is placed in the Mole's *run,* and is baited with earth-worms or a bit of raw meat. On the Mole entering the trap and setting the spring at liberty, it is suddenly caught up, a noose drawn tight by the reaction of the twig, and the mole suspended by the neck. If you like to be at the trouble, you may in this manner destroy your own moles; but if your inclination or leisure does not tend that way, you can nearly always obtain the services of a professional mole-catcher, these men being in the habit of travelling about the country, seeking for employment, and their charge being a trifle per dozen, in proportion to their success—no *kill* no *pay*.

I recently met with what I conceive to be a far more efficacious, and less troublesome mode of destroying moles. The directions I am about to give appeared in the form of a letter, in "The Sportsman's Magazine," a very creditable London periodical. The letter is very short, so I quote it entire:—

"SIR,—A correspondent of yours, some weeks since, put a query on this subject, which, as I have not seen answered (although rather out of season), perhaps you will find a corner for the following. I will answer for its efficacy.

"Take a quantity of fresh worms, put them in a wooden box, with a small quantity of carbonate of barytes in powder, and let them remain for an hour or two; then find out the runs where the moles leave the fences for the land, lay in every run five or six worms, and continue doing so as long as the worms are taken away by the moles. I was infested with moles before I used this remedy, which was about fifteen years since, but have never been injured since, by giving a little attention to them in the spring."

I communicated the above remedy to an English friend, and he has since written to me, confirming its entire efficacy.

In Ireland there are neither moles nor weasels, the animal known there under the latter name being, properly speaking, the stoat or ermine.

THE RABBIT is unquestionably, when left to its own unrestrained devices, a very serious pest, but an animal which may, nevertheless, with proper management, be rendered a very considerable source of emolument, while the annoyance they have occasioned will be, at the same time, abated.

Rabbits are divided by breeders into four classes—warreners, parkers, sweethearts, and hedgehogs. Burrowing under *ground is* favourable to the growth and quality of the *rabbit's fur*, and the *warrener* is, on this account, most in the previous blow. Warren rabbits are less profitable than those kept artificially, and are more prone to mischief. They are, indeed, likely to prove pests to your farm, and I would recommend their extirpation, which may be effected by ferreting, having previously placed small purse nets over the mouth of the holes. You may shoot them as they bolt, if you choose, but in doing so you injure the *fur*.

Now as to the Rabbit in the character of a nuisance. It is the *hedgehog* that is most to be dreaded, for you can never be fully on your guard against his visits, and one is destroyed only to make room for another. Nooses placed in the paths he is known to frequent are recommended by some. My objection is that you are liable to snare a hare as well as a rabbit, and that is a deed of which, as a sportsman, and under the present system of game laws, you would, of course, not desire to be guilty.

The Rabbit commits but little mischief amongst the green crops in comparison with its ravages amongst young trees, and growing plants; and they may be prevented from injuring these by a very simple process. Mix common coal tar with equal portions of cow-dung and lime, and with a brush smear the stems to the height of about thirty inches from the ground. The repetition of this treatment annually will effectually preserve the trees from their attacks, while the numbers of the rabbits must, of course, be kept within proper bounds by shooting or ferreting. There are also different descriptions of net used by warreners for taking rabbits, some account of which may prove useful. The *fold-nets* are so laid as to form an enclosure between the burrows and the usual place of feeding; into these the rabbits are driven by dogs at night. The entrance is then closed, and in the morning the rabbits are secured, and slaughtered for market.

The *spring-net* is so constructed, as to close on pressure; *it is laid round a* corn or hay-rick, and numbers will be thus taken. As these nets will best be procured by purchase, a detailed description of them is unnecessary. The best mode of taking rabbits is by means of the *trap*. For this purpose dig a pit in the run most commonly frequented, and have it considerably wider at the bottom than at the top; across this lay a board, so nicely balanced upon a central pin, that the weight of the rabbit is sufficient to weigh it down at the extremity, while, at the same time, that weight removed, the board will resume its former position. Numbers will be taken by this method, and if by accident an indiscreet hare have fallen in, you can, if you please, set her at liberty. It may be useful to remark that a Rabbit is very tenacious of life, and that it will frequently, if shot in the rear, succeed in making its escape; in shooting them, aim, therefore, always for the head; if there be an earth near, and it be only struck behind, it will be sure to escape into it, and perish and rot uselessly in its burrow.

THE HARE.—This is rather a delicate subject. The hare certainly does a very considerable amount of mischief, and that also to a much greater extent, especially amongst the green crops, than does the rabbit; while the agriculturist is, on the other hand, compelled to tolerate the nuisance, not being permitted, according to the game-laws, to kill hares, without a licence, even on his own land. The cost of a licence varies from £3 to £4 per annum; and it is questionable whether or not it be not worth the farmer's while to take it out, in order to possess the power of preserving his crops from this pest. A revision of the game laws, both in this and in other respects, is much called for. Meanwhile it is as well to state that the use of coal tar, as described in reference to the rabbit, will be found equally efficacious in preserving trees from the attacks of *this animal*, and that the painting of gate-posts and palings *of a white colour* at *intervals*, will, to a great degree, scare them from the more valuable crops. The hare feeds in the evening and early in the morning, so that it is at these two periods that you will require to be most upon your guard.

The Fox.—If the former be a *delicate subject*, how much more so the present. This is a Pest, and a decided one, and under present circumstances, one only to be *mitigated*—remove it you cannot—by being very obliging to your neighbouring sporting gentry, and affording them every facility, as far as your lands are concerned, for destroying it in "regular hunting." Look sharp to your young lambs and poultry.

RATS, MICE, AND THEIR KIND.

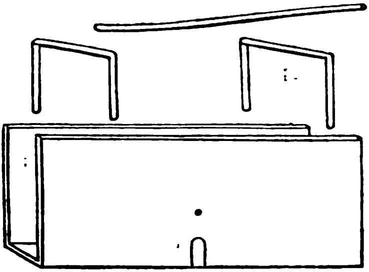
We have hitherto been discussing subjects, in which a greater degree of interest is to be expected from the landed proprietor or country gentleman, than from the mere farmer; some also presenting rather a doubtful aspect, as affording the possibility of the query arising as to the positive or actual title which they hold to rank amongst the "*Pests*" of "the Farm." The present chapter is designed to embrace an inquiry into the character of a class of animals relative to which no possible mistake can exist,—a class of animals

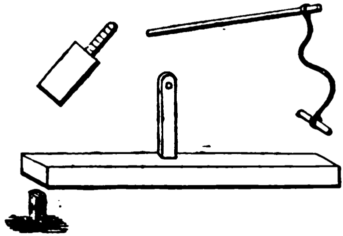
whose depredations are universally felt—animals noxious to all, and possessed of no single redeeming quality which can elicit the defence of any one advocate. It has certainly been frequently made a question whether we are entitled to attempt the extermination of any race of animals, seeing that all have been created with a beneficent intent, and for some wise purpose of Providence. As to *extermination* meaning *extirpation*, that is an end that, even with the greatest assiduity on the part of man, it would be next to hopeless to expect to arrive at; but surely none will question the right which man, as the heaven-appointed lord of the creation, possesses to protect his property from the inroads of the invaders, and to check, by every means within his power, the *extension* of any race of animals, who, if they are to live, must live, to his detriment, upon the fruit of his labour. The wolf was once a terror to the shepherds of these islands; he is now exterminated from them. Will any rational man question the propriety of the exertions upon which this result depended?—and yet the wolf did not commit more ravages, in his own peculiar sphere, than still do many of the animals of which we have been treating—than do those which are designed to form the subject of the present chapter. Of all four-footed vermin, perhaps, rats and mice, with their varieties, are the greatest foes to the agriculturist, nay, to man generally. It is, in short, but a choice between their extermination and his; for if suffered to increase in numbers, unchecked, the time would not be far distant when the entire globe would but suffice to furnish food for their rapacious appetites, to the exclusion of the human race, created by our Divine Maker himself, its legitimate sovereign and lord. As I have already hinted, sentimental theorists need not fear the *extinction* of this troublesome tribe; let us proceed with all our vigour—*let us call* into exercise every resource of human cunning, *and we shall* still find ourselves, to a great extent, baffle by these diminutive marauders, who, despite of all our efforts, continue to thrive, to multiply, to grow fat upon the products of our toil. The utmost that we can effect is to decimate their ranks; we may diminish their numbers, but extirpate them—never! And yet, compelled as I am by *truth,* and induced as I am to speak that truth by some remarks on this subject, in reference to an article of mine which appeared in a Scottish newspaper, I should be sorry to have it supposed that I *hate* any tribe of animals with a peculiar hatred, or that I select the rat tribe in particular for the manifestations of my enmity. On the contrary, I am far from blaming the poor creatures for their predatory habits. I am fully aware, that in following them, they do but follow certain instincts implanted for wise purposes in their natures, and which, when the earth was yet scantily peopled, and artificial culture comparatively unknown, must have conduced greatly to utility. So it was at creation—so it has been. But many tribes of animals were then created by the Almighty with a view to *so many special purposes.* According as man advances in knowledge and consequent improvement, so does the necessity for the intervention of brutal aid decrease, until at length what was at first a blessing, will, if suffered to remain, become a *pest.* So it was with the Rat. In earlier ages, when man had no settled habitations, but roved to and fro upon the earth, killing, eating, and *wasting,* the aid of such animals, as *scavengers,* was most necessary, in order to maintain the atmosphere in such a pure and healthful condition as was necessary for his support. As cultivation of the soil commenced and progressed, and as the nomadic habits to which I allude ceased, so did the necessity cease for these animals to exist in their wonted numbers. We may, therefore, legitimately conclude, I think, that *when it becomes,* as it has become, a positive battle between *the rats and man for* the produce of the ground, and when that produce owes its existence to the labour of the latter, that he possesses every legitimate right to exterminate, if he can, his vermin foes, root and branch, and to cry, with the clearest of consciences, "War—war to the—" trap!

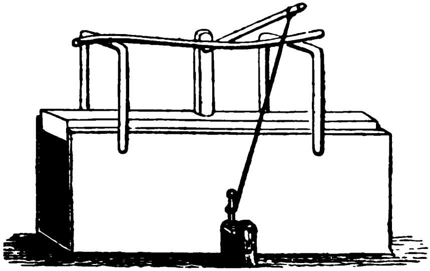
There are three descriptions of Rat generally known as a nuisance to the farmer or merchant: the common Brown or Norway Rat, the indigenous Black Rat, and the Water Rat. The last mentioned is seldom a true rat; for what is usually known as *Water Rat* is not a rat at all, but an animal of an allied genus, properly to be called *Vole*. The common Brown Rat sometimes also presents *Albino* characters, that is to say, it is occasionally to be found of a white colour, with red eyes. In the neighbourhood of Greenock, for instance, there were, some years ago, numbers of these Albinos to be met with, especially about the shipping; some specimens were sent me, and I kept one in my possession as a pet for a considerable time. It is not my intention, neither would it suit the purpose of the present work, to enter at any length into the natural history of these animals; a brief description will therefore suffice.

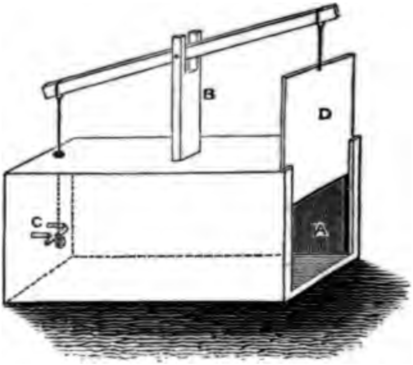
The most formidable is the common Brown Rat (*mus decumanus*), an animal for whose importation we are indebted to the Norwegians, and which has now almost wholly extirpated our indigenous variety, the Black Rat (*mus rattus*). These animals require no description;—very little to our satisfaction, we are too well acquainted with their appearance. The Black Rat is smaller than the now common variety; its colour is a slaty blue, sometimes a jet black, and its tail is longer and more scaly than that of its Norwegian conqueror. The White Rat is rare, and is merely an accidental variety of the Brown. These animals are all equally mischievous, and resemble each other in their habits, so that the same mode of destruction will answer *for all*. Various plans for the destruction of rats have *been suggested*, but I confess that I am not a little sur prised that the adoption of some effectual means should be so little general as it, for I am prepared to assert that were all who suffer from the ravages of these pests to apply themselves energetically to the task of getting rid of them, they would—not, certainly, be wholly exterminated, but would become so reduced in numbers as to be no longer formidable—cease, in short, to occupy a position among the "Pests of the Farm." Under present management, almost the only attempt ever made to diminish their numbers consists of a battue at the taking down of a corn stack, or an occasional rat hunt got up by the men about the farm, with the aid of a few terriers.

There are two methods by which rats can be effectually destroyed—TRAPS and POISON. Some writers have recommended the former; others have been in favour of the latter. My own experience induces me to state, that neither is to be adopted to the exclusion of the other, both being equally good under certain circumstances; it must, however, be admitted, that trapping is only suited to instances where the vermin are *few in number;* where they swarm, wholesale measures must be resorted to, and the trapping of individuals would be idle and useless. When traps are to be employed, a small steel spring-trap, similar to that which I have described when treating of the wild cat, martins, &c., but of course much smaller, is that to be preferred. It must be washed after each capture, and the person who sets it should disguise the natural odour of his person, by using a little malt, impregnated slightly with a mixture of equal parts of the oils of rhodium and carraway. The proportions are 1 part of the mixed oils to 5,000 parts of malt. A portion of this should be rubbed between the hands at each manipulation; this is one of the great secrets of professional rat-catchers. The above is one of *the most attractive* baits for rats that can be used, and may *be either employed* in baiting traps, or in acting as a vehicle for using poison. There is another very good description of trap, similar to that used for *martins*, already described, open at both ends, the doors closing on the rats running upon a bridge in the middle. We have endeavoured to explain the construction of this trap in the three accompanying woodcuts, the two first of which represent the parts of the trap in a detached state—the third as it appears when set. There is also a very simple description of trap, which any rustic can make, and which, in the absence of better, may be used with effect: it consists of a long box, open at one end, having the sides grooved to admit a sliding door. The better to enable the reader to understand the construction of *this* trap, we subjoin the accompanying wood-cut:









A—Represents the entrance.

B—An *upright*, supporting a horizontal beam, attached at C to a string fastened to a bit of meat, which, passing between the two wires represented in the wood cut, is thus held in that position.

D—Is the door, formed of *slate* or *iron*, or some other heavy material, and running freely in grooves.

When the horizontal beam is drawn downwards, the bit of meat placed between the wires at C, the door D rises, and the trap is set. The rat, entering at D, bites the meat at C; the weight of the door, no longer restrained, brings it suddenly down, and the animal is trapped. There cannot be a better trap than this, when the nuisance is confined to a few solitary rats; but, as it only catches one at a time, it is comparatively useless where these pests exist in any number: the fact is, that poison is then the only method to be relied on. There are many objections to the use of poison; amongst others, the obvious one of the danger of poultry, dogs, or other animals, eating the fatal mess, and falling victims to their error. To obviate this and other objections, I shall show how the desired end can be attained by means of a substance *fatal to the rats alone*—the basis of that substance is phosphorus. The discovery was originally communicated, by the well-known chemist, Dr. Ure, to the Agricultural Society of England. *I quote from a* newspaper in which the account appeared at *the time* :—

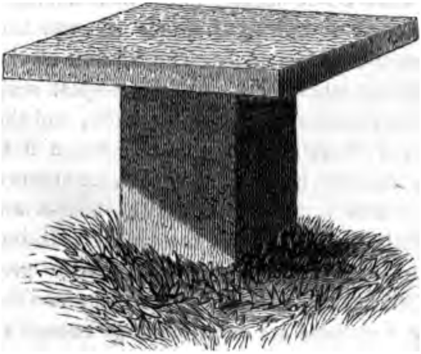
"The following recipe for the destruction of rats has been communicated by Dr. Ure to the Council of the English Agricultural Society, and is highly recommended as the best known means of getting rid of these most obnoxious and destructive vermin. It has been tried by several intelligent persons, and found perfectly effectual. Melt hog's lard in a bottle plunged in water, heated to about 150 degrees of Fahrenheit; introduce into it half an ounce of phosphorus for every pound of lard; then add a pint of proof-spirit or whiskey; cork the bottle firmly after its contents have been heated to 150 degrees, taking it at the same time out of the water, and agitate smartly till the phosphorus becomes uniformly diffused, forming a milky-looking liquid. This liquid, being cooled, will afford a white compound of phosphorus and lard, from which the spirit spontaneously separates, and may be poured off to be used again, for none of it enters into the combination, but it merely serves to comminute the phosphorus, and diffuse it in very fine particles through the lard. This compound, on being warmed very gently, may be poured out into a mixture of wheat flour and sugar incorporated therewith, and then flavoured with oil of rhodium, or not, at pleasure. The flavour may be varied with oil of aniseed, &c. This dough, being made into pellets, is to be laid in rat-holes. By its luminousness in the dark, it attracts their notice, and being agreeable to their palates and noses, it is readily eaten, and proves certainly fatal. They soon are seen issuing from their lurking-places to seek for water to quench their burning thirst and bowels, and they commonly die near the water. They continue to eat it as long as it is offered to them, without being deterred by the fate of their fellows, as is known to be the case with arsenical doses. It may be an easy guide for those who are desirous of following Dr. Ure's prescription, and may not have a thermometer at hand, to know that temperature of 150 degrees of Fahrenheit is equivalent to a degree of heat midway between that at which white of egg coagulates, and white wax melts."

I have little to offer in addition, except to suggest that the vehicle with which the compound of lard and phosphorus is to be used should be *fresh malt,* instead of a mixture of sugar and wheaten flour; and I would also suggest the following preparation to be added, as an *allurement,* to induce the rats to eat freely of the compost:—

Oil of Rhodium	...	...	1 scruple.
Oil of Carraway	...	...	1 drachm.
Oil of Lavender	...	...	5 drops.
Oil of Aniseed	...	...	10 drops.
Tincture of Musk	...	...	2 drops.

This is to be added to the compost, in the proportion of about 10 drops to the ounce. If kept in a well-stopped bottle, and a bit of bladder tied over the stopper, it will retain its strength for a length of time. The compound of phosphorus and lard was known to professional rat-catchers before Dr. Ure communicated the above formula to the Agricultural Society. A few applications will effect the clearance of an entire premises, and the object then to be desired is to prevent their return. In the "Farmer's Magazine," vol. viii. p. 452, the following receipt is given for this important purpose:—"Take one pound of nitre, and one pound of alum; dissolve them together in two quarts of spring water; get about a bushel of bran, and make a mash thereof, putting in two pints of the above liquid, and mixing all together. When you build your stacks, every second course, take a handful or two of the mash, and throw upon them till they come to the easing. I have never *seen* this tried, but an agricultural friend states that he has tried it, and found it so successful that he never has a stack put up in any other manner.

Rats may be destroyed in great numbers in a barn, in *the following* manner:—Before all the corn is removed, get some common iron chafing-dishes, which fill with lighted charcoal, upon this strew a quantity of broken *stick* brimstone, quit the barn as rapidly as possible, holding your breath the while, close fast the door, and leave the building shut for the next two days. On re-entering the barn, you will then find quantities of rats lying dead round the chafing-dishes. Some may have been stifled in their holes, and their bodies might, if no precautions were taken to prevent it, create for some time an unpleasant smell; to prevent this, you have only to stop up all the holes with mortar. Perform this operation again the following harvest, just previous to storing, and you will no longer have any reason to complain of annoyance from the rats. As to the corn in stacks, *it will be impossible for rats to injure them,* if they be built upon proper *staddles of stone or iron*—the former should be built with an overhanging ledge, which will prevent vermin from ascending—this is unnecessary in the case of the latter, the *iron legs* presenting a sufficient obstacle to their ascent.

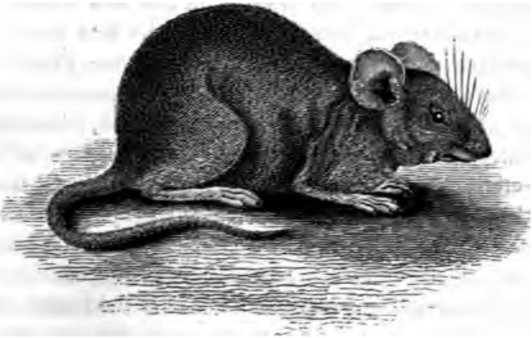


The water-rat, or more properly, Water-*Vole,* is somewhat larger than the common rat, has a short tail, and small round ears. This animal rarely exists in numbers sufficient to do any very great amount of mischief; a ferret and a brace of terriers will, at all events, effectually clear *a stream of* them in a very short time, and the chase will *afford exciting* amusement of a summer evening.

I shall conclude the subject of the destruction of rats with an amusing account of a novel, but apparently, under the circumstances, a most effective mode of accomplishing this object, published in a periodical now extinct—"THE DUBLIN LITERARY JOURNAL."

"BARRACK FOR RATS.

"An extensive bacon-merchant in Limerick (John Russell), who kills between forty and fifty thousand pigs in a season, has adopted the following successful method to destroy the rats which abound on his premises, where the abundance of food will always occasion a vast collection of these troublesome and destructive animals. He has erected a quadrangular stone building, eleven feet long, and seven feet wide, with a wall three feet high, having flags laid flat upon the top, but projecting a little over the inside of the wall. All round the wall inside, at the base, are numerous holes, like pigeon holes, which do not go quite through, except a few to allow a free passage to the little animals. Outside of the barrack is a plentiful supply of water and food, such as bones and useless offal. The interior of the walls is occupied by boards, lumber, and straw—just such concealment as these animals are known to prefer, and the whole is covered by a moveable wooden roof. When it is judged proper to destroy them, the passages are stopped at the outside, the roof is lifted off, and the boards are taken out. The frightened animals run up the wall, but their escape is impossible, for they strike against the projecting flags and fall back again. They then run into the small holes below, but these are only just large enough to admit their bodies, whilst the tails remain sticking out, a secure prize to the men who go in over the wall; and by this unlucky appendage they suddenly drag them out, and *fling them to a posse* of anxious dogs outside of the fortress, *or into a barrel* of water, where they are soon destroyed. As there are not holes enough in the wall inside, the noise and uproar soon frighten another division of rats into the vacated openings, and these being treated in the same unceremonious manner, the whole garrison is thus speedily destroyed. As many as seven or eight hundred have been killed in one clearing. Rats being fond of straw, they also become very numerous on the lofts where this article is kept, to be used for singing bacon, and they cut it into short pieces with their teeth, which renders it useless for this purpose. The proprietor tried the effect of putting a pet fox to mount guard on the lofts, and it was found that he killed such quantities of the rats, that three or four were procured to garrison the place instead of one. When we visited this extraordinary establishment some time ago, the additional foxes had not been procured, but we saw that which was first on trial, looking fat, contented, and happy with its new occupation."



MICE.—Of this tribe there are several varieties, which some regard as distinct species, while others assert the contrary. I have neither space nor inclination to enter into controversy for the behoof of my agricultural friends, and shall confine myself to facts. The common *House-mouse*, with which all are familiar, is the enemy most to b dreaded in-doors, in the barn, and in the corn-stack. Wherever there are rats, Mice will be few in number, the former preying upon the latter. In the field the farmer has both the house-mouse, and two descriptions of field-mice, or *voles* (*arvicola*) to contend with, a long and a short-tailed. These are the principal, and include several sub-varieties. All holes in a dwelling-house should be stopped with lime and pounded glass. The fumigating system will exterminate them from the barn, and if the stacks be built as I have directed, the corn there is safe from their attacks. It is in the field that the battle has to be fought—it is there that Mice are really formidable, and require ingenuity to baffle and destroy them. Poison sown in the drills will, of course, destroy Mice, but poultry and birds will possibly suffer with them. Our great object, therefore, must be to discover some substance fatal to them, and innoxious to larger animals. The small size, and delicate constitution of the mouse, renders this no very difficult matter; and if every farmer will follow my advice, his fields will be soon free. In the first instance, lest farmers should suppose that I exaggerate the havoc which these animals perpetrate, much of it possibly without the knowledge of the proprietor of the soil, who vainly speculates mentally in conjectures as to the cause of his grain-crop having proved so light, I shall present them with the following statement, on the authority of Mr. Maxwell, author of "Wild Sports of the West," who, if I mistake not, quotes from Mr. Jesse.—"An extraordinary instance of the rapid increase of mice, and of the injury they sometimes do, occurred a few years ago in the new plantations made, by order of the crown, in Dean Forest, Gloucestershire, and in the New Forest, Hampshire. Soon after the formation of these plantations, a sudden and rapid increase of mice took place in them, which threatened destruction to the whole of the young plants. Vast numbers of these were killed—the mice having eaten through the roots of five-year old oaks and chesnuts, generally just below the surface of the ground. Hollies, also, which were five and six feet high, were barked round the bottom; and in some instances the mice had crawled up the tree, and were seen feeding on the bark of the upper branches.

"The following account will show the numbers of mice caught in the different enclosures in Dean Forest, in three months, from September to January, with the number of acres, and the proportion between the long and the short-tailed Mice:—

		Acres.	Short-tailed Mice.	Long-tailed Mice.	Total.
Haywood	enclosure,	418	12,850	8	12,858
Oily Hill	do.	41	1,161	11	1,172
Crabtree Hill	do.	372	7,851	...	7,851
Park Hill	do.	113	2,665	...	2,665
Shut Castle	do.	163	484	33	517
Sallow Valley	do.	386	1,361	...	1,361
Barnhill	do.	50	70	...	70
Birchwood	do.	50	3	...	3
Whitemead park	do.	100	1,559	15	1,574
	Total Acres,	1,693		Total Mice,	28,071"

Having now satisfied you of the reality of this nuisance, let us consider some of the modes in which it may be removed.

In "British Husbandry," vol. ii. p. 552, it is stated that the tops of last year's shoots of furze, chopped small, and sown with the corn, will prevent their depredations; and it is added, in a note, that their ravages had run to such a height, in some parts of France, as to have *ruined the farmers!* The mode adopted in that country for their destruction is also given—"At Angerville, whole farms have been given up to the proprietors, in consequence of their continued devastation; and the only method known of checking them is to defer the sowing any grain until *spring*, which precaution occasions them to forsake the *fields*, as it deprives them of the means of winter subsis tence." The method adopted in the Forest of Dean, the ravages committed in which we have described above, and which proved efficacious to the fullest extent, after all others had failed, consisted in boring holes in the ground, to the depth of twenty inches, wider at the bottom than at top, in which was dropped some favourite food. The mice willingly entered, and from the form of the hole, being prevented from getting out again, were taken in such numbers as speedily rid the ground of them. One of the best pieces of advice on this subject that I remember to have met with is the following, from an old book, entitled "Compleat Husbandrie," published in Dublin, about one hundred years ago. It runs as follows:—"Let the farmer first consider the nature and quality of his ground, and which fields are, from the nature of their soil, most likely to harbour the intruders, also in what places they are most mischievous. Let him never sow these *under furrow, i. e.*, until the intruders have been expelled; for that method of cropping deprives him of the power of combating his enemies. They work under ground, as it were, and will never come into the way of his poison. When these fields have been sown otherwise, and harrowed over, the mice *must come upon the surface*, and dig down for the corn, and they will then certainly meet with anything he lays on the ground for them." So far, so good. The author proceeds to point out the description of poison to be employed. This is, "a peck of barley meal, a pound of powder of white hellebore root, and four ounces of powder of staves-acre, and when these are all mixed together by sifting through a coarse hair-sieve, add half a pound of honey, and as much milk as will work the whole into a paste. Let this be broken in pieces, and scattered over the field at the time when the mice are known to be *coming. They will* eat it greedily, and it is certain death *to them. There is* nothing in any of the ingredients disagreeable to the taste when thus mixed; and every morsel of it will be devoured. The mice will be kept from digging after the corn, and, at the same time, will be killed by the ingredients." I have heard farmers who had tried the above, speak favourably of it. But the most successful remedy of which I have yet heard is dropping into the *holes*, and on different portions of the field, pellets of the phosphoric compound described when treating of the rat. A little trouble of this kind, taken in the heat of summer, when the holes can most easily be seen, will soon greatly diminish the number of the mice, if not wholly extirpate them.

Before leaving this section, I conceive it advisable to say a few words of two valuable aids in the destruction of many of the *pests* which I have enumerated. I think that a few words of advice as to dogs and ferrets may not be amiss; for, after all, the worst of these four-footed plagues is undeniably the *rat*. There are three *distinct* sorts of terrier—the common Scotch, the Skye, and the English. The Scotch is a strong, wire-haired dog, standing moderately high on his legs, with a thick head and a broad muzzle; the Skye is very short on the legs, long in the back, small head, and narrow-muzzled; his hair is also stiff and coarse; the English terrier is short, close-haired, stands high on his legs, has a thickish head, with a long and fine muzzle, and is usually of a black-and-tan colour. It is not, perhaps, very material as to which of these breeds you have, provided you train them properly to their game. I recently saw some very singular terriers with Mr. J. J. Nolan, of Bachelor's Walk, Dublin, called Harlequin terriers. In general form they resemble the English, but are rather *finer*; these dogs are remarkable for their rat-killing powers, in which I understand they are unrivalled.

The proper time for entering your whelps is at the age of six to eight months; if you do it earlier you may blink or *cow them*, and if you neglect it to a later period, you ma find them unfit, too old for tuition. One great point is to teach your dogs never to *mouth*—this would prevent them from being rapid killers, and would cause the escape of many a rat: teach them to kill a rat in a single chop, and then to drop the carcase. After the dog is entered, you will readily effect this by putting him into a corn bin with a dozen or two rats; he will then be in a hurry to get at all, and will not waste his time with any individual.

FERRETS are originally natives of Africa; it will, therefore, be obvious that they require warmth and a perfectly dry hutch. These animals are by no means to be trifled with, as they are only half reclaimed. Goldsmith says they have been known to attack and kill children in the cradle. Mr. Jesse relates an incident that occurred a few years since at Kingston in Surrey, of a ferret attacking a child, and having it nearly killed before it could be removed, and even then persevered in its attacks until its back was broken by repeated kicks, and it perished. I myself was one evening looking for a bitch ferret which I missed from her hutch; it was dark, and I had only a candle to aid me in my search, when she suddenly sprang at my face, as I was stooping over her place of concealment—the gloom had prevented my seeing her—and seized me by the cartilage of the nose, to which she hung with all the obstinacy of a bulldog. I succeeded in getting her off by plunging my face into a tub of water.

When ratting, some ferrets require *muzzling*, as otherwise they will, if they capture a rat, lie upon the carcase, and, after satiating themselves with the blood, fall asleep there; if they do so, you may get them out by means of *smoke*, but the use of the muzzle is better. This consists of a little round bit of leather, having a hole in the centre, through which the ferret's nose is passed, and attached with side straps to a collar which encircles the neck. Be careful that *there be no loose* straps or strings about it, as these might become entangled with roots, &c., in the hole, and thus keep the ferret prisoner till starved to death.

In conclusion, let me observe that you should not *throw away* the *skins* of such of your four-footed Pests as you may succeed in capturing. They will prove more valuable than you are aware of; you may, if you like, send them off to a furrier's for preparation, but can, with little trouble, prepare them yourself.

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SECTION II.

PREDACIOUS BIRDS.

EAGLES—KITES AND HAWKS—ROOKS, ETC.

In some parts of England, Scotland, and even Ireland, especially in the northern parts of the two former, and the south of the last-mentioned country, the Eagle is a formidable "pest of the farm," pouncing from time to time upon the various inmates of the poultry-yard, and carrying away the young in its talons, and even occasionally extending its depredations to a young pig or lamb; besides, being, in some instances, known to attack a sickly or dying beast, and to anticipate death by (vulture fashion) pecking out its eyes. Still it must be admitted that the Eagle usually behaves in a nobler manner, and, unless when very hard pinched by appetite, contents himself with such prey as he can convey away to his nest, or, as it is called, his eyrie, on the distant cliff.

There are three sorts of eagle whose depredations are most to be feared by the farmers of the British Islands. These are, the Common or Black Eagle; the Golden Eagle, and the Sea Eagle. A few words will suffice relative to these birds, and the one set of directions will equally apply to all. The best mode of protection against the *ravages of the* Eagles is to shoot them where seen, and to have their nests annually robbed. This is best managed by offering a bounty for the capture of young ones, or, as they are called, the *Eaglets.*

All the Eagles rear a similar structure as a nest—it is a flat bed usually placed in a dry, inaccessible place, on the summit of a lofty crag, and, if possible, between two rocks; this latter arrangement is with a view to shelter. The young are like goshawks, and about the size of a small goose. Those of the Golden Eagle should be taken alive, if possible, as they are of some value, fetching a good price in menageries, and in the collections of the curious; they are readily known by being, like a bantam cock, *feathered to the toes.* This will be sufficient to enable you to distinguish the Golden Eagle from any other, independent of colour, which is variable.

The Kite, Sparrow-Hawk, Kestrel, Merlin, and Hobby, are scarcely worth any notice, except in a body. Any amount of injury the poultry may experience from them is very small, and of very rare occurrence; and, at all events, only such as may be very well staid off by occasional use of the gun. The Kite is the most troublesome of these birds; and I have found that if a kite be shot, and nailed against a barn door *in terrorem,* his brethren will be deterred from visiting that homestead.

The Raven (*Corvus Corax*) is a retired and solitary bird: it occasionally swoops upon a stray chicken, or turkey poult, or haply a young duckling; but these birds are so easily scared away, and are so fond of retirement, that they are scarcely objects of dread.

The Crow (*Corvus Corona*), the Hooded Crow (*Corvus Cornix*), and the Rook (*Corvus frugilegus*), build nests similar to those of the raven; and, like that bird, on the loftiest trees they can find—the only difference being in the *lining.* Of these birds, the Rook is the one which has *more particularly* incurred the resentment of the farmer.

It would be difficult, indeed, to determine whether the Rook is entitled to the obloquy he has had cast upon his name by some, or to the protection so anxiously demanded for him by others. He is, on the one hand, accused of pilfering the young crops, or rather, indeed, of pilfering the newly-planted seed, ere even it has had time to germinate. He is, on the other hand, acquitted of stealing seed, and shewn to be a most zealous exterminator of many of the most destructive insect pests the farmer has to complain of—amongst others that justly dreaded, but little understood marauder, the terrible wire-worm.

In the *Sussex Express* of August, 1844, there appeared a paragraph, the object of which was to show that the Rook had been hitherto the victim of calumny and misrepresentation—being, in reality, one of the farmer's greatest friends, instead of, as he was always considered, one of his most inveterate foes. I quote the paragraph:—"On *Thursday last*, a great number of Rooks were shot on the estate of William Oliver, Esq., when an old bird was killed, having in its craw nineteen large grubworms, and seventeen wireworms." However annoying these birds may be, therefore, it is plain that, with all their mischief, they do some little amount of good. The query to be solved is, whether of the two preponderates? Much controversy has taken place on the subject, the most important portion of which I shall lay before my readers; they may then judge for themselves whether the Rook is to be protected or destroyed.

I have myself little doubt but that there may be a good deal of truth on both sides of the question, and the conclusion to which I have arrived is two-fold:—1st, the Rook is neither to be *preserved* nor exterminated, but his numbers kept within proper limits; 2nd, there are circumstances regulated by the nature of the country and its cultivation in the neighbourhood of a rookery, which render such a thing either a nuisance or an advantage. A gentleman, a friend of mine, Thomas Butler, Esq., of Jordanstown, in the county Dublin, informs me that he has repeatedly shot Rooks, and on opening them, for the purpose of pursuing this interesting and important inquiry, has invariably found nothing in the craw but *masses* of grubs, maggots, and the wireworm.

The paragraph I have quoted above appeared also in the *Farmers' Gazette* of September 21st, 1844, and elicited the following reply:—

(*To the Editor of the Farmers' Gazette.*)

"Hollywood, Sept. 27th, 1844.

"SIR,—In your *Gazette* of the 21st ult., I find an article from the *Sussex Express*, headed 'Farmers' Folly,' which goes on to state that in the craw of a crow which had *been shot, there* had been found nineteen large grub-worms *and seventeen* wireworms; and concluding with, 'this must be a convincing proof that they (the Rooks) are decided friends to the farmers.'

"My attention had been previously drawn to that subject by an intelligent small farmer, who resides near a rookery, which has been colonized for only two or three years. He, with several other farmers, requested me to bring the subject before our Agricultural Society, at its anniversary meeting, and, by having the matter noticed in the papers, draw public attention, as well as that of agricultural societies, and the proprietors of rookeries to it; that after due consideration of the usefulness of crows, balanced against their predatory habits and destructiveness, an impartial verdict of 'guilty, or not guilty,' might be returned, and acted upon.

"One farmer very shrewdly remarked, that the fact of the wireworms being discovered was a very narrow basis to found a theory upon: and he thought a much more important inquiry would be, *how many times a couple of old crows* would visit a potato-field, and *carry away seed,* during the time their young required support in their nests? Another farmer said he had carefully examined three drills in a tolerably long field, and counted the number of places where the seed had been removed, and he had come to the conclusion that there was not more seed left in the three than would make two drills complete. Another had visited the rookery, to watch the habits of its tenantry, where he found, by computation, about five bushels of seed potatoes lying strewed about. The old crows only remained on the edge of the nest so long as the young could dislodge and lift out the potato from the pouch at the end of their widely opened bill; and they appeared to remain away only so long as they could quarry out another seed with their powerful bill from the nearest potato field, and return. Thus there was a constant coming and going of *more than one thousand crows with seed potatoes.*

"*Others* regretted that large quantities of seed potatoe were strewed about on the pasture fields; and where the seed had been set whole, and could not be carried away, they were torn out, and left in the sun, quite useless. My own experience of their depredations extended from the time the new potatoes began to form, until they were nearly ripe, on about half an acre of early kinds; and the rooks were daily visitors, always at an early hour, and occasionally during the day. In this manner a very considerable quantity of excellent potatoes, fit for the market, was destroyed. Similar complaints have reached us from every quarter."

I may now observe that it is a common custom amongst Irish farmers, whose lands are infested with the wireworms, to *roll* the fields with a heavy roller, after nightfall, or early in the morning, the periods at which these grubs come up to feed, in order, by this process, to close up the holes whence they have issued, and thus, by preventing their return, preclude their concealing themselves from the *rooks*, which *prey upon them.*

I have also frequently heard extensive and intelligent farmers assert, that not only did they not grudge the poor rooks the few potatoes they took during the time of rearing their young, but that they even conceived them to be richly entitled to such, if it were only as a slight sort of compensation for the *vast amount of service* they rendered the farmer during the other portions of the year, by devouring the wireworm and other noxious grubs. As I have already stated, however, it is not my intention to *plead* on either side, but simply to *state facts*, and leave the reader to his own conclusions. There can at any rate be but little question that no animal, not directly a source of profit to man, can be permitted to multiply to an indefinite extent without prejudice; and whether the rook be really more a benefactor than a marauder, it is obvious that he would speedily remove all doubt from the matter, were his numbers permitted to augment to such a degree as they would, in a very few years, were no means taken for restricting them. I am, therefore, of opinion that wherever there is a rookery, there should be an annual slaughter of the young birds as they begin to leave the nest; in other words, when they are called *branchers*. This should take place about the last week in May, or the first in June, according to the season. Such destruction will prevent too rapid an increase, and will, at the same time, leave a number amply sufficient to prevent the existing stock from decreasing; besides which the young rooks will be found admirable eating, either in the shape of pie, or a simple stew, for which purpose they only require to be previously skinned.

I wrote, some time ago, a few short articles on the subject, in the *Ayrshire Agriculturist*, in the course of which I took occasion to solicit the opinions of such of the readers of that paper as had paid attention to the subject. Amongst other replies appeared the two following letters, which I now gladly republish for the benefit of my inquiring readers. I am most anxious, indeed, to furnish to them plain facts, and the statements of practical men, and then, without at all prepossessing them in favour of any supposed opinion of mine, to leave them to form their own conclusions.

"Sir,—Mr. Richardson, in his last article in your journal, proceeds to discourse on the Rook (*Corvus Frugilegus*), and after stating several facts, both for and against the statement that it is one of the "Pests of the Farm," desires the experience of agriculturists on the subject. Now, so far as mine goes, it is to the effect, that in all closely-cultivated land, with large rookeries in the vicinity, it does infinitely more mischief than good to the farmer; and this is not an individual opinion. Some fifty landed proprietors *and farmers* signed a requisition, shewing the great *injury they* sustained, and presented it to the owner of of the largest rookeries in this vicinity, desiring him to reduce the numbers to an amount consistent with the supply of their natural food, or allow means to be taken for doing so. This application was in a great degree unsuccessful, the reason assigned being that the rook is a maligned and persecuted creature, and that it does a great amount of good to a farmer—in fact, far counterbalances the evil.

"Before proceeding to show in what circumstances and in what way the rook is injurious to the cultivator, I first premise that it, like all other created beings, has a legitimate sphere of usefulness assigned by the Creator, and that it is only when man interferes that it becomes hurtful. In a state of nature, the bird has a host of enemies to encounter, and there is no gamekeeper to destroy these *its* pests; neither is there any plough to turn over fresh clods of earth, with their accompanying inhabitants; no turnip fields, with their wide-spread store, or more hidden potato breaks; and for what of the cereal grain may exist, it has to fight for its share with its equals in strength or cunning. Its feet and bill must procure its food; and its numbers, of course, are much more scanty than when it is found under the fostering care of man. I think all those who have written in favour of the rook give it as their opinion, that grubs, wireworms, earthworms, and slugs, are its only food; that these, of course, it prefers to all other kinds, and, therefore, now it ought to be preserved, if this opinion is correct—which, not being versed or pretending to be learned in natural history, I do not gainsay. However, the converse must be correct if the rook is found to live chiefly on potatoes, turnips, young wheat blades, as well as the grain when mature—in fact, on every product of the farm which is food for man or bestial: then *some change has* come over its natural dispositions and *habits, and, therefore,* it ought to be destroyed. Now, sir, these last are the habits of the bird where I am acquainted with it. I can easily believe that, in a purely pastoral country, where there are no cultivated fields, but few rookeries, and these thinly inhabited, and none of the cultivated crops spread out before its view, that the mode of living of the rook may be such as described by naturalists, and no farmer would then insist for its destruction, though the amount of food regulates its increase. Even in a country where much of the soil lies in old pasture, and but a field here and there only broken up, the rook may be serviceable by picking up, destroying, and ridding the fields of the grubs, slugs, and wireworms that have been produced in the old grass; but even here the time of its usefulness in cultivated fields is confined to a short period of the year—to that period in the year when furrow after furrow is turned over, thereafter when the seed is sown and the surface turned up by the harrow, or when the small clods that remain imperfectly broken can be displaced. The crop soon prevents all access to soil, and it is only again on the next ploughing after its removal that it can again obtain access; and during the greater part of the winter weather, slugs, grubs, and wireworms come much to the surface. No doubt it may be seen walking cautiously and knowingly over the grass lands, but then I generally found that when any of them were shot, that it was the harmless earthworm it had been in search of. Should you deem the foregoing of sufficient importance as to be worth a place in your paper, I will follow it up with a few observations on the mode in which the rook is injurious to the farmer in this locality.—I am, sir, yours, &c.

"M.

"Rathoe, 10th Nov., 1846."

"*Sir,—In* my last communication I conceded that th rook may not be hurtful to the holder in a purely pastoral country; that the good or ill in a partially-cultivated district might be of a chequered nature; and shall now proceed to show in what manner they become such pests in a closely-cultivated tract of land.

"The object most to be desired in such a district is, the production of the greatest amount of vegetable food that can be obtained from the smallest extent of surface. Whatever, therefore, tends to lessen this amount, either by carrying off the seed after it is committed to the ground, or by destroying the produce, or from increasing the cost of production by the additional expense of preserving it, is an evil, and ought to be remedied. For the sake of clearness, we will instance a farm under the six-shift course, of say—1st, potatoes or turnips; 2nd, wheat; 3rd, sown grass; 4th, oats; 5th, beans; 6th, wheat or barley. The potato seed is, or rather was, put into the ground from the 1st of April to the 25th of May, and during the whole process of planting a constant pilfering of sets goes on, and so soon as the young plant pushes its leaflets above ground, the attacks are renewed and maintained until the crop is taken out of the soil in autumn. Constant watching is the only preventive, and this is no easy matter; for so bold do they become that nothing but powder and shot will drive them off, the rattle and the bogle* being equally inefficacious. A boy being found fault with some time ago for allowing much injury to be done to a field he was in charge of, and, being provided with a pistol and powder, it was thought that he had no excuse; "but," says he, "you maun gi'e me lead, for a wheen o' thae auld craws would sit on the point o' a very pistol, gin I would let them!" A ten-acre field, that had cost £100 for manure, in this vicinity, and which I examined at the period that the potato disease commenced, for the purpose of ascertaining if it was tainted or not, I found to be sadly abused with the rooks. There was not a single plant alongside of which there was not a hole made by their bills for the purpose of getting at the tubers; and, had the taint not appeared, the black invaders would soon have done their work. This field had been little heeded, and, driven from other places, they found a refuge here. This was an extreme case; but in my own field, not far off, every fourth plant had a hole opened at the side of it, although a boy had been in charge of it. So much for their ravages on the potato crop. The turnip also suffers to a considerable extent, although the period of the year during which they prey on it is shorter, and confined chiefly to January, February, and part of March, when, from severe storms of frost and snow, any other food cannot be reached, or, perhaps from choice. They make deep incisions into the bulbs, whereby, in numerous fields, so many as four or five tons per acre have been rotted, and I have frequently removed, to prevent farther injury, from six to eight cart loads of Swedes per acre from the field, that had been pierced or half-eaten. The wood pigeon might no doubt assist in this, but the rook is generally the first to break the skin of the tuber. The wheat is sown about the 1st of October, and from that time onwards until spring, as occasions offer; and although steeping the seed in a solution of blue vitriol may prevent them devouring it when just sown, no sooner has it begun to spring than it becomes of too alluring a nature to be resisted, and bushels of it go over their capacious throats. As many as 300 and 400 grains have been found in the gizzards of several of them that have been shot, and 100 is a small compliment. The young blades, too, form an agreeable condiment to the harsher turnip, and are pleasantly varied by a change to the tender leaves of the sown grasses and clovers. The root of the red clover plants I have often seen pulled up, deprived of its leaves, and left t wither. The oat is the next crop in the course, and here I must do the rook the justice to state that I think he is not over fond of it, especially should superior food be to be had; and although naturalists state that the spring seed-time is the only season they do any mischief, I would humbly submit to them that that is the period they are of any service to the farmer at all. Insect life of all kinds being re-invigorated by the returning warmth, and the husbandman's operations a-field permitting access to their subterranean retreats, the rook has his choice of food; but, strange to say, even at this season, when I have examined the gizzards of any that had been shot, I found generally earthworms and grains constitute the contents, and, perhaps, a solitary grubworm.

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* *Scarecrow.*

"We have now seen that all the crops on the rotation are subject to its depredations; and, lest it be thought that this arises from the rooks having consumed all their natural food, rid our fields of every destructive slug, and that, after having done so, we ungratefully turn round on them, and cry them down, I have merely to state a case, in which it was incontestably proved that the readiest and most accessible food is that which they prefer. A field of twenty acres had been sown with wheat, on the 12th October, 1845. Beans were the previous crop, and the land was full of slugs; indeed, so plentiful were they, that on breaking the surface the interior resembled an honeycomb, from the immensity of their roads. Adjoining this field there was another of twenty-eight acres, where potatoes had grown. Wheat was sown on it about the second week of November, and finished about the end. The first field was brairded before the other was sown, and the crows having been most assiduous in their attacks upon it while it was but newly sprouted, left it so soon as the leaves got full out, and were almost never *seen again to light* upon it. The braird, which was good *and thick enough*, soon began to show the effects of the grub, and by the evening few plants were left from their ravages. Another field, where no grubs were found, was instantly set upon, and in some out-of-the-way manner much of the wheat was carried away, notwithstanding the herd: the grain, therefore, was preferred to the grub.—I am, sir, yours, &c.

"M.

"12th November, 1846."

These letters are of the most valuable description, and are almost calculated to produce conviction. As I have already said, however, let my readers judge for themselves. I now insert the following report of a meeting of farmers, in the neighbourhood of Kirkliston, in Scotland, for the purpose of taking into consideration the best means of getting rid of a *rookery*, and its *pernicious consequences*, kept by a landed proprietor in their neighbourhood. I quote from the *Agriculturist*:—

"NEWLISTON ROOKERY.

"The farmers in the neighbourhood of Kirkliston held a meeting there, on the 25th ult., for the purpose of taking into consideration what would be the best means of getting rid of the serious grievance to which they are subjected by the great increase of rooks, caused by their being protected at Newliston. The attendance was numerous. William Hill, Esq., of Hillwood, was called to the chair, when the following resolutions were moved, seconded, and unanimously agreed to:—

"First,—It having been long felt that the immense number of rooks protected in this locality cause great loss, by their consuming so much of the seed corn, the grain crops when ripening, and after being stacked, as well as turnip and other crops, and that the expense incurred by herding is very great, whilst the remedy thus afforded is far *from being* effectual, that the evil having now become excessive, it is requisite to adopt such measures as shall insure its removal.

"Second,—It being the declared opinion of many naturalists, that neither grain nor root crops form the natural food of the rook, but that they feed on grubs, worms, and such like insects, it appears perfectly obvious that their numbers have so increased, by protection, that they have outgrown their natural food, and been compelled to resort to the cultivated produce of our fields for sustenance. It is, therefore, the opinion of this meeting, that the only effectual way of removing the evil is by materially diminishing their numbers.

"Third,—That as Newliston Rookery is the chief source from which this evil proceeds, a deputation be appointed to wait upon Mr. Hog, with a copy of these resolutions, to urge the propriety of means being had recourse to for redressing the grievances complained of. After which

"Mr. Hog being present, rose, and stated that he had come to defend himself, not to defend the rooks. He thought he had been very ill used, and complained of the manner in which he had been attacked in a newspaper. He had been charged with being the protector of the rooks. He was their defender, not their protector, as every season he had allowed liberty for the use of a hundred and fifty guns one day at shooting young ones, by which their numbers were kept down. It was not his intention to enter on the question of the natural habits of the rook. He had no doubt they were fitted to serve a wise purpose under Providence; but their numbers would so increase by protection that they might become a grievous burden on the community. He believed that, in his neighbourhood, they inflicted all the injury to the farmer that was alleged of them, and even more; but was he to blame for that? Could any gentleman present tell him the number of rooks that inhabited his rookery during the winter season?

Would there be 5,000 or 50,000? (Mr. Dudgeon.—Double that number.) Well, their numbers were unknown, but the numbers breeding in his rookery were known. He had counted the nests, and found their numbers at present to amount to 2,663—double that number would be the number of rooks for which he was accountable. The overwhelming multitude that took possession of his woods from September to February—multitudes that literally darkened the air—the gentlemen present were as much responsible for as he was. Why should he be made responsible for all the rooks bred and protected at other rookeries—at Hopetoun, for example, Clifton Hall, Barnton, Beechwood, Calder House, Dalmahoy, and in the Meadows of Edinburgh? Why single out him as the sole object of attack, and leave all the proprietors of other rookeries unchallenged? He had said before that he was not the protector of the rooks. There were no less than 7,000 young rooks destroyed at Newliston in one season—nearly the whole of the young were annually shot, and he was as anxious to prevent the winter gatherings as any gentleman present could be. How could he do this without cutting down his trees? He knew of no other remedy; he would and could do no more than he had done.

"Mr. Dudgeon, Almondhill, then rose and said, that admitting all that had been said by Mr. Hog about the numbers of rooks to be correct, still Newliston Rookery was the source from which the evil arose. The quantity of grain they consumed was enormous. A gentleman present had made a calculation, the result of which was, that it would require thirty bolls of wheat to furnish them with even one meal per day, admitting their numbers to be 30,000. He did not mean to say they actually obtained this quantity; the farmers had to protect themselves *against their taking* it. Had not the farmers been the *most patient* and simple class in existence, they would never have submitted to be plundered in the way they had been. He had for several years been compelled to employ always two, and generally three hands, from one year's end to the other, and what with wages, powder, and produce destroyed, his loss was at least £100 per annum. Besides, the annoyance was excessive; when absent from home, during the week, or on Sunday when at church, the recollection that his people might not be doing their duty was most harassing. He called upon Mr. Hog to say whether, if they were not protected at Newliston, they would congregate in such numbers during winter.

Mr. Hog replied, that they would become far more numerous, by going to places where they were more protected.

"Mr. Dudgeon said, that few, if any, of the rookeries named by Mr. Hog were protected at all.

Mr. Gibson, Over Gogar, then said, that as a great number of rooks congregated at Newliston during winter, which did not belong to it, he would tell them of a case similar in Berwickshire, where recourse was had to means which proved successful. A few men stationed at dusk in the rookery, kept firing at the rooks as they lighted on the trees, by which numbers were killed, and strangers effectually driven away.

Upon Mr. Hog being asked if he would allow this plan to be tried, he said—Gentlemen, I can say no more, and will do no more than I have done.

A committee was then appointed to communicate with the proprietors in the district who had rookeries, and ask their co-operation in lessening the evil, after which the meeting separated."

The writer on this subject in "British Husbandry," says, "we confess that we coincide in the opinion of those naturalists who attribute the dislike of farmers rather to prejudice than fact, for they (the rooks) live more upon the insects found in the earth than upon grain. In a dry spring, indeed, when worms are scarce, they will dig out the newly-set potatoes; but if we look round the country, we shall find that in land in the immediate neighbourhood of those antiquated mansions where rookeries have been for ages established, the crops are not less plentiful, and the ground is perhaps cleaner than in places situated at a distance." And a note is appended, which it would be unjust to the poor rook not to quote: "In the year 1825, our fields were so completely overrun with the wild mustard, that for six weeks there was not a blade of corn to be seen, and every barley field was covered as with gold; but on the Earl of Traquair's fields, around the rookery, there was scarcely a single plant of the noxious weed to be seen."—*Quarterly Journal of Agriculture*, vol. i. p. 640.

"It is but simple justice to these oft-censured birds to mention the service they at times perform for our pasture lands. There is no plant that I endeavour to root out with more persistency, in these places, than the leafy hair-grass (*Aira Cæspitosa*). The larger tufts are pretty well got rid of; but the multitudes of small roots are so interwoven with the pasture herbage, that we cannot separate them without injury; and these our persevering rooks stock up for us in such quantities, that in some seasons the fields are strewed with the eradicated plants. The object of the bird in performing this service is, to obtain the larvæ of several species of insects, underground feeders, that prey upon the roots; and I do not believe that he ever removes a specimen that has not already been eaten or commenced upon by the caterpillars."—*Ibid.* vol. ii. p. 308.

We now take leave of this interesting subject, and, with a few parting observations, of the subject of the feathered pests of the farm altogether. We stated at the commencement of this section, that sparrows, finches, and such small-fry, required but slight notice; they are nevertheless worthy of a few brief remarks. These little birds do a good deal of mischief just as the seed begins to shoot above ground, but it is doubtful whether it would not be more advisable to scare them with *flags* or scarecrows, or to employ little boys to frighten them away, until the season of their ravages be past, than to shoot, or endeavour otherwise to exterminate them. *Drill sowing* and *steeping* the seed previous to sowing, guard it to a considerable extent, especially the latter, the taste imparted being so nauseous, that the birds, the little epicures, will have nought to do with it. It is tolerably certain, at all events, that the common practice of offering parochial premiums for the destruction of sparrows, is, to say the least, imprudent, for these small birds more than compensate the farmer for the little of his grain they take, by the destruction of vast numbers of grubs and other formidable pests which constitute by far the major portion of their food.

We now turn to the third portion of our subject, and by no means the least interesting, or least calculated to awaken the deep attention of the practical farmer, or every man who derives all or a portion of his subsistence from the soil.

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SECTION III.

INSECTS.

It is in the *larva* state that the ravages of insects are most felt, and this requires a word or two of explanation.

I presume it is already known to my readers that butterflies, moths, and many other insects, undergo a succession of changes, or transformations, prior to their assuming their last and frequently gorgeous form, under which we see them fluttering from flower to flower, or treading the mazes of the giddy dance amidst fields of sunshine, which is reflected in brilliancy from the glowing hues of their many-tinted wings. Of course, I speak now more particularly of the Butterfly. The moths are usually, though, no doubt, many of them are extremely beautiful, much more sober in their movements, and less gaudy in their plumage. They are, also, principally of nocturnal habits, and consequently come less frequently, and less strikingly, under our notice.

A few words will furnish a simple explanation of the mode in which these flies are propagated. The female moth or butterfly deposits an egg, which, gradually ripening to maturity, becomes a maggot, grub, or caterpillar. This is called the *larva*, and it is in this stage that the insects prove most noxious to the farmer's crops. These larvæ are excessively voracious, and their ravages terminate only with their next transformation into the state of *pupa*, or *chrysalis*. Prior to assuming this state, the caterpillar forsakes its food, and seeks some retired and safe retreat, usually, indeed, burying itself for this purpose underground. The head then gradually bends forward, and the face is embraced by the upper or *thoracic* feet; the body likewise becomes contracted in its dimensions, more particularly in its length, and also gradually becomes covered with a firm and shell-like coat or case. This is a thickening and induration of the *skin* of the grub, not of the *epidermis* or *cuticle;* for that is gradually *cast* as a slough, in proportion as the work of transformation proceeds. The chrysalis is soon formed; some insects envelop themselves in a web, as the silkworm, &c.; others do not. During this stage, the insect is, of course, perfectly harmless. In course of time, the perfect insect is formed within its shelly sheath; it now commences the work of breaking open its prison, having effected which, it emerges in all the beauty of insect perfection. This is the most beautiful moment of the insect's life. Its newly-born form is clothed in garments freshly tinted by the pencil of the Creator; the work is then just as it proceeded from the Divine Hand—a work, wondrous as are all His, calculated to elevate our thoughts in a peculiar manner, and lead us from the grovelling ideas connected with time and humanity, to contemplate the wonders of eternity and of Deity." Even here, I cannot avoid reminding my readers of the striking analogy subsisting between the phases of our own existence, and the transformations I have just been describing. We are conceived—the germ grows into a human form—*vegetates* for a few years on the surface of the globe: this is man's *larva* state, and few, I think, will question the rapacity, the love of self—the *voracity*—he exhibits during his continuance in it—man dies—is enclosed in a *shell*—is buried in the ground, and lies there, until, at the call of the awakening angel, he will emerge perfect in the glorious image of his Maker. Pardon this brief digression, but the analogy between insect transformations and the phases of man's existence struck me as being too remarkable to be passed over without remark.

Caterpillars do not prey indiscriminately on all sorts of herbage or farming produce. Each species has its favourite plant, or plants; and not even *starvation* will induce it to transgress these limits that instinct has assigned to its appetite, or eat of a plant of another sort. One of the most remarkable of our caterpillars is that of the Death's Head Moth (*acherontia atropos*). This caterpillar is from five to seven inches in length, and as thick as the middle finger of a very large man. I kept one of these caterpillars through its changes, which were effected within five weeks from its abstaining from food to its becoming a moth. The leaves of the potato appeared the favourite food of the caterpillar in my possession. This species feeds also on the leaves of sallows and willows.

The most destructive grub which infests the fields of the agriculturist, or renders futile the care and skill of the gardener, is, perhaps, that well-known larva—the WIREWORM. I may here observe that the general name of *wireworm* is *given to the larva* of upwards of sixty species of beetle, all, *however, very* similar in habits and appearance, and so equally gifted as to their destructive powers, that it would be difficult, indeed, to draw any distinction in this respect between them.

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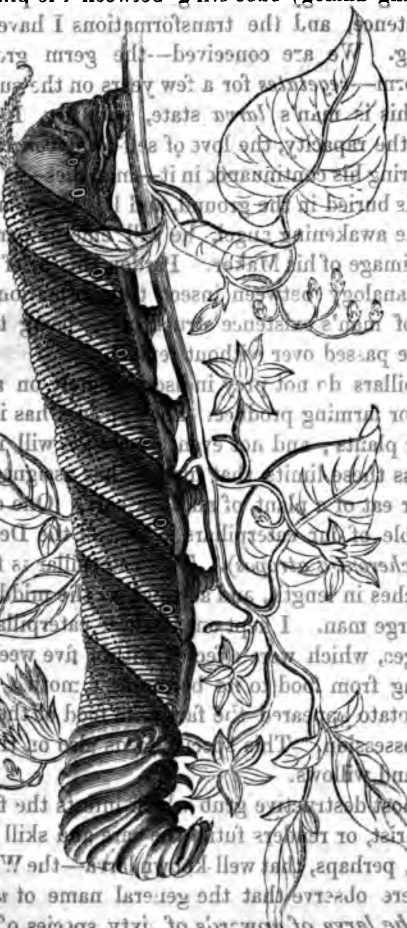


The Death's-Head Moth.

Scarcely any land is free from the ravages of some one or other of the wireworms; and there is scarcely any description of crop upon which they will not prey with equal

greediness. Wherever grass or any sort of herbage will grow, there will the greedy wireworm be found. The beetles, of which the wireworms are the larvæ, are those called the ELATERS; also spring-beetles, skipjacks, and click or snip-beetles, from the power they possess of springing up with a click or snap-like noise when placed upon their backs. The eggs of the wireworm are very minute, and are deposited in the earth at the root of the young plants. When first hatched they are invisible to the naked eye, but attain nearly the length of an inch when full grown, and in this state of larvæ they remain for nearly five years. No wonder, therefore, that, between their longevity and rapacity, they should be deemed by farmers so very pestilent a scourge. During the continuance of their larva state, these worms cast their outer skin several times, being white in colour, and very tender for a short period after each sloughing; at other times they are covered with a hard and solid coat of a horny consistence, so firm and impenetrable as to render them proof against most of the ordinary remedies that might be used for their destruction.

Wireworms are somewhat more than half an inch in length, and resemble the meal-worm in appearance, but are more *angular*, less perfectly *cylindrical*, more flattened above and below. Their head is horny and formed for *perforation*, and the mouth, though small, is furnished with a most effective pair of very powerful jaws. There are six feet on the upper portion of the thorax, and one at the extremity or tail. The former are called *pectoral* or *thoracic*, the latter *anal*.

When full-grown, the wireworm buries itself in the ground, where it forms a cell, in which it becomes a chrysalis or pupa; this change takes place early in autumn, and in two or three weeks at farthest it becomes a beetle. The beetles are harmless, feeding only on flowers; they can fly well, and when on the ground can run very fast, with their heads down, and drop when approached. The mouth is not the same in appearance with that which existed in the worm, but will, on examination, be found to be formed of the same organs, only *perfected*.

There are four species of beetle that produce the wireworm, more common in corn-fields than the rest, and therefore the more to be dreaded. These are: the *elater sputator*, *elater obscurus*, (most common in spring), the *elater lineatus* (most common in summer), and the *elater euficadus*, the largest of the four, to be found plentiful in the spring, on nettles. The millipedes, crane-fly larva, &c., are also, but erroneously, called wireworms by the farmers; they are, however, very destructive, and shall be spoken of in their proper place.

The wireworms usually eat into the stalks just about the roots, and sometimes separate it from the root altogether; they seldom, however, remain so long engaged upon the one *spot or portion* of stalk. When they attack potatoes, they penetrate into their very hearts, and thus frequently wholly destroy the sets when newly planted; to obviate which it has been recommended to plant whole potatoes.

Amongst the green crops, turnips may be regarded as the greatest sufferers, and the tender young plants are, of course, most victimized in autumn. Multitudes of these ravenous grubs may then be found gnawing at the roots of the young turnips, and even biting off their extremities. They also frequently attack the stalk, bite it across, and when the stems fall, attack the leaves. This is, however, one of the least formidable of the robberies of this persevering pest, and if the *wireworms* were satisfied with the leaves alone, they would not be so injurious. In gardens, lettuces are the principal victims, but the annual flower-plants also suffer greatly—pinks and carnations are gnawed across their stems, and rendered lifeless. I will now offer some suggestions for the extirpation of this very rapacious insect.

It is, as I have already had occasion to observe, most necessary that we should possess some acquaintance with the *natural history* of such animals as we desire to destroy. Such knowledge facilitates our operations, by informing us of their haunts and habits, of their dispositions and predilections, and, consequently, not only of *where* we are to seek for the pests, but of *how* we can best set to work to accomplish their destruction. Recollect, I may remark, in passing that the BEETLES, whence the *wireworms* are produced, are, although not necessarily mischievous themselves, to be regarded as the grand source of your annoyances. Let it be your care, therefore, to have these caught and destroyed; they will be chiefly found, during spring and summer, upon nettles, hemlock, fools' parsley, and other such herbs. Let this be *one* of your cares.

Still, however active you may be in destroying the beetles, *you will find that* you have succeeded only in *diminishing the numbers of this* pest; you cannot hope to extirpate them; but is it not some consolation, even to have succeeded in effecting a *diminution* of their numbers?

The eggs are chiefly deposited in pastures where the surface has been undisturbed, and in clover layers and fallows. Where, therefore, they make their appearance, you will find it a good plan to have your pasture eaten close by sheep. *Rolling,* in early spring, is also recommended, and is, in my opinion, very likely to prove serviceable, having been preceded by a top-dressing of lime. I recommend a top-dressing of lime, salt, and soot. Such farmers as I have prevailed upon to try the experiment in this country (Ireland), have found it very efficacious. The proportions I recommend are as follow:—

Lime	...	...	...	2 parts.
Soot	...	...	...	3 parts.
Salt	...	...	...	1 part.

The salt may be purchased from salt works, or extensive dealers in that article, as *spoiled* salt—there being accidents which will render it unfit for market as salt, without at all militating against its value as manure, or a top-dressing. The lime should be quick-lime pounded, and the mixture should be applied to the land as speedily as possible after having been compounded: be it also remembered that this composition will be found a valuable fertilizer, as well as a foe to insects of all sorts. Woad, sweet gale, the refuse of gas-works, spirits of tar, chloride of lime, nitrate of soda, mixed with the manure, will be found very serviceable; at all events, effecting a sensible diminution in the numbers of the wireworm, and of course a diminution of their ravages in an equal ratio.

It has been tried to destroy the wireworm by *flooding,* but this is only a useless attempt, it being almost impossible to drown this creature, which will be found as lively as ever after total immersion for three, or even four, days; *still, however,* such flooding, though it will not destroy the worms, interferes with the *laying* of the beetles which produce them, and will consequently, in this point of view, be occasionally found useful.

The following, being an extract from a letter from an agricultural friend, was read by Mr. Palmer, M.P., at a meeting of the "Farringdon Agricultural Society," in the beginning of the spring of 1846:—"The way I use *soda* is, to sow it broadcast; I have never found it fail. The chemist, your friend, must have been ignorant that good *soda-ash* contains fifty per cent. of free alkali. The last year I had a failure of beet carrots, which I attributed at the time to the season, but upon examining the soil carefully, I found WIREWORM. As it was to be wheat this year, and my last sown wheat, I mixed it with *soda-ash.* It is now growing faster than any wheat upon my farm, and not a blade missed. Until I adopted the use of *soda-ash,* I suffered sometimes to the amount of SIXTY IN A FIELD! The discovery was accidental; I had sown a headland with it as a fertilizer, on the principle laid down by Sir Humphrey Davy, that all alkalies were stimulants to plants; it certainly improved the crop, but upon the whole, I considered it a failure. The following spring it was *turnips,* and a man hoeing asked me, "If anything had been done to the *headland?* I asked him 'Why?' He said, "*There was not a plant destroyed by wireworm, and the rest of the field had fifteen to a nest!*" I then determined to try it upon another field which was full of wireworms; *I have never since seen one in it.* In the following year, I had twenty-five acres of oats attacked more generally; I happened to have a cask by me, and ordered it to be sown. From that day the ravages ceased, and within a week the whole field had changed its colour to a vivid green. I have since ceased to consider it as an experiment, and have always *a cask by me ready,* in case of any appearance of the *wireworm, and have* not a patch as large as my hand suffering from wireworm on my farm." This is no vain boast; I have known soda tried by practical men, who were most unwilling, unless actually coerced into it, to listen to any novelty, and they have unanimously asserted the success of their experiments with soda. It is equally efficacious in repelling the attacks of the *green fly*, which, from its ravages and the difficulty that has been experienced hitherto in getting rid of it, might, though the insects are of different species, very fairly be entitled the twin-brother of the wireworm.

In gardens, that most certain of remedies, *hand-picking*, may be resorted to. Lettuces are, as I have stated, among the most frequent sufferers; let, therefore, the earth be gently scraped away from about the roots of such as are affected, the worms removed, and the earth then as gently returned. Hand-picking may also be resorted to in the case of young turnips, and in such fields as are bordered by a marsh; for it is in the immediate vicinity of that marsh that these worms will be found to congregate in the greatest numbers. In gardens, the wireworm may also be attacked, and destroyed by means of poison and traps; the former will answer for the worm, and the latter for his parent, the beetle, or elater. For poison—slice potato stalk, or turnip, or parsnip, or carrot, or even marigold, or beet-root—take a feather, and dip it in a solution of corrosive sublimate, dissolved in alcohol, or spirits, then lightly touch the bait with the feather, and having allowed the spirit to escape by evaporation, stick the bait into the loose soil, near such plants as had previously indicated the presence of the worm. This remedy is of course peculiarly suited to *gardens*, but it may nevertheless be adopted by the farmer with some success. Birds also consume immense quantities of these worms; as also do frogs, *toads*, and those beautiful little creatures resembling *the lizard* in form, but differing from that class of anim in being furnished with gills, like a tadpole, during the earlier stages of its existence. I allude to the Water Eft, or Newt, which, at certain seasons, leaves the water, and, emerging up on the land, makes great havoc among many of our insect pests.

This reminds me that the frog is often unjustly persecuted by gardeners, under the idea that it eats or spoils their *strawberries*. Nothing can be more erroneous. I, myself, conceiving it allowable to sacrifice one or two lives in order to save many thousands, killed and opened several frogs, and never did I find any portion of strawberry in their stomachs, but invariably *numbers* of insects. I have spoken to many intelligent gardeners on this subject, and have found my opinions confirmed. Let frogs and toads, therefore, be encouraged on your lands—recollect that the fabled poisonous character of the toad is only a tissue of nonsense; that the animal's entire food consists of *insects*, of such creatures as you are most anxious to destroy. Call them in, therefore, to your assistance—protect them, regard them as your friends and labourers, and they will aid you most extensively. The robin, blackbird, wagtail, thrush, together with poultry, and rooks, &c., feed on these insects; but it is for you to consider whether these birds are likely, by their destruction of insects, to compensate for the damage they themselves personally do to your crops.

Next in mischief to the wireworm may possibly be reckoned the Turnip Fly. The Turnip Fly is a term applied indiscriminately to several species of larvæ; but as their ravages are the same, and the modes to be employed for their effectual destruction are likewise the same, it were more than merely unnecessary to enumerate them. The same directions will apply to all. About two or three years ago, Mr. Walls, of Ayr, published some interesting remarks on the subject of this fly, and gives it as his opinion that the only effectual mode of preventing or getting rid of the ravages of this fly is *deep sowing*—sowing the turnip-seed to the depth of two or three inches, and to have it, if possible, amongst the manure. Mr. Walls seems to be of opinion, that to a contrary mode of procedure are the ravages complained of to be attributed.

At a meeting of the Council of the Royal Agricultural Society of England, 8th May, 1844, Mr. Beards, agent to his Grace the Duke of Buckingham, communicated to the council the following method of destroying this most troublesome insect:—"I took (says he) an old sack, had it ripped open, into the form it was when cut from a roll of canvas, had it nailed to a pole, the thickness of a pitching-fork handle, leaving the pole about eight inches at each end longer than the sacking. I then had one side smeared over with *tar*, made two men—one at each end of the pole—draw the sacking, the tarred side downwards, regularly over the field, letting it sweep the ground, carrying it at an angle of about forty-five degrees, fresh tarring with a brush every 'bout,' or oftener if required; on examination I found great numbers of flies sticking to the tarred sacking. I repeated the operation, once a-day, for four days, and saved the plant of turnips. Since that time, when I have discovered flies on the plants, I have pursued the same plan, and have not, from that time to this, had occasion to plough up a single acre from the effects of the fly. I have, for several years past, used *gas tar*, in consequence of its leaving a stronger scent in passing over the plants, than common tar, and which prevents the flies that are not caught, from devouring the same. I do not mean to assert that once going over a field will prevent the destruction of a crop; it must be persevered in, according to the strength of the fly, and the state the land is in."

Mr. James Sherring, farm-bailiff to Mr. Henning, of *Frome House*, Dorchester, then spoke to the following effect:

"A month, at least, before I begin sowing my turnips, I purchase the different sorts of seed I may require. I provide vessels for the reception of such, adding to every 20lbs. of seed, half a pint of linseed oil, taking care to have it well mixed; I add 1lb. of the flour of sulphur every morning; I have the whole rubbed between the hands, to get the seed in a proper state for drilling; the drill-man must be apprised of what seed he has to use, otherwise he will not drill a sufficient quantity, as the sulphur will choke the cups; this, of course, must be lookod to. As I before stated, I have practised this experiment for the last twenty years, without a single failure, and, I believe I can safely say, without losing a plant. The early part of last season, the fly made great ravages in some parts of this county, but not one did I perceive in a field of my employer's."

Colonel Challoner's plan is as follows:—He procured double the quantity of seed required, under ordinary circumstances, for a single sowing—one-half of this seed he steeped in diluted tank-water for 18—24 hours, and sowed in on the land in the usual way; in about a week afterwards he sowed the other portion of the seed, which had undergone no preparation, over the same land. The result proved that, by this arrangement, a tendency to germinate one fortnight earlier was given to the turnip-seed by being thus previously steeped, over the remainder sown in its dry state, and the consequences were that a full crop of turnips was uniformly secured; for if the soaked seed came up in dry weather, it was devoured by the fly, which, being thus apparently satiated with the first supply of green food, was found to leave the succeeding plants arising from the dry seed, untouched. If, on the contrary, the soaked seed came up in wet weather, it remained the standing crop, as the fly, from the uncongeniality of the atmosphere for its development, had not then made its appearance, and consequently reserved its ravages for the plants of the second sowing.

I give these three methods of avoiding the destructive ravages of the turnip-fly; but, at the same time, I must observe that I, for my own part, am disposed to attach more importance to that proposed by Mr. Sherring, than to either of the others.

Another remedy, recommended by many, for preserving the turnip from this fly, is to pour a quart of spirit of turpentine on every six pounds of seed, rubbing it in the hands, and leaving it to dry. Another is lime, in powder, cast or dusted over the field, late in the evening, or early in the morning; and many assert that *road* dust is also very efficacious when applied in a similar manner. Irrigation with tobacco-water is also recommended. The following communication, from a gentleman of well-known agricultural skill, appeared in the *Farmers' Gazette* of July 3rd, 1847:—

"A SIMPLE RECIPE FOR TURNIP-FLY.

"SIR,—About three weeks ago I made a communication to the Royal Agricultural Improvement Society, stating the success of an experiment which I made to rescue my Swedish turnips from the fly which was devouring them. He has not brought it before the public, and I beg to state, that knowing it was only by overcoming their power of smelling the turnip, by something still more powerful, I thought of gas-lime, which I had dusted over the Swedes, at the proportion of about half a barrel an acre, along the line of turnips. The effect was most powerful; the insects became stupified, and before twelve hours not a fly was to be seen. If it had not been for its efficacy, I should have had to sow again about twenty acres.

"Yours, &c., "ROBT. RAWSON."

If an opportunity occur for a summer fallow, trampling with cattle may be found useful; but I would strongly recommend my readers to try the following—a remedy, of *which I* have had considerable personal experience, and which I consider as almost the only certain method yet put forward for the destruction of such insects as prey upon the leaves or stalks of plants. I have found this remedy peculiarly successful with a most destructive pest.

The following notice of the effects produced by the turnip-fly in those animals which feed upon the crop, is worthy of, to say the least, insertion. It is a certain fact that rabbits, which are in the habit of feeding upon field turnips which are affected by the turnip-fly, contract a vermicular disorder, which appears to have escaped the notice of the most accurate observer of nature. The worm generated by the fly, which is a *tenthredo*, must, it would seem, be deposited in the shape of *ova* in the plant, and in that form be taken into the animal's stomach. The writer of this, when residing at Shipton Bellinger, near Andover, had a very fair opportunity of investigating this fact. There was a belt of furze of about five acres which verged upon a turnip field, the latter being exceedingly troubled with the turnip-fly. This furze was a warren for rabbits, and not one coney out of some scores that he killed, from time to time, was exempt from these vermiculi, which had, in many instances, eaten their way into the hepatic lobes of the creature, proving ultimately thereby destructive to many of them at a certain season of the year. The worm is a short white flat worm, about half an inch in length, and there are in some cases nine or more of these intestinal enemies to be detected in the liver of one animal. In other spots the rabbits after being shot, were found to be perfectly free from the above malady. How far sheep may be affected by feeding upon a similar vitiated diet, the writer has never been curious enough to inquire; but an inference may be drawn from what he has stated in the case of the rabbit, which may, upon inspection, be found to apply to the former animal, as the latter is exceedingly liable at seasons to hepatic ailments. [illegible] myself state from personal experience [illegible] the fly-affected *turnip* and the fly-affected *bean* are highly injurious, and frequently *fatal* when so given as food to rabbits. The disease produced being *worms* in the intestines.

THE BEAN-FLY fully deserves to share our notice with that just under consideration. This is a small black insect which frequents the tops and heads of beans, and which has hitherto apparently defied all the ordinary modes of eradication. It is not long since my attention was called to the subject. I tried for this insect a remedy I had also found successful in the extirpation of the turnip-fly, and the following is a description:—

There are two modes by which this desirable object may be effected:—

1.—By sprinkling the crop with water saturated with freshly-burned lime, salt, and soot, in equal proportions. This I have usually found successful, but should it fail, or should the presence of *millipedes*, or other pests, add to your annoyance, you had best proceed at once to *fumigate*. I have heard *sulphur* recommended for this purpose; but in my own practice, and I have paid minute attention to the subject, I have found that sulphur alone will in many cases fail. The following never did so; we come, therefore, to

2.—To fumigate.—For this purpose, take a small portion of *orpiment*, mix it with equal parts of sulphur and assefœtida, and wrap the whole well up in a quantity of soft paper, previously impregnated with nitre—in other words, in *touch-paper*; place this on a shovel, proceed to the field, and, taking care that the *wind be blowing from you*, set fire to it; hold the shovel close to the ground, and fumigate in this manner, gradually moving along until the whole field has had the benefit of the effluvia. A second, or even a third performance of this operation may be necessary, when the field is large and heavily cropped; but that will be found to have fully answered [illegible] I feel satisfied that this *fumigation* would effectually [illegible] pate the "*Aphis vastator*," by Mr. Smee and others regarded as the cause of the potato disease. It is surely worth a trial.

While on this subject, I may mention a mode of destroying slugs, snails, wood-lice, and other pests, who frequent either *walls or hedges*—it is very simple, and I have never known it to fail in any instance. Get some freshly-burned unslaked lime, break it up rather small, and strew it along the ground beneath the wall or the hedge. Do this about twelve o'clock at night. Visit your garden in the morning, and you will find your lime slaked and covered with numbers of your late enemies, *all dead*—a few repetitions of this process will effectually rid you of them. I have been asked for my advice as to the best mode of destroying bugs. If these very disagreeable guests have taken possession of a *house*, I know of no method by which you can hope ever to get rid of them; but to remove them from a *bedstead* is an easy matter: form a *saturated solution* of corrosive sublimate in spirits of wine, and apply this to *every portion of the wood*, taking care that *every crevice* is well impregnated. Do this about three times, at intervals of about a week—of course the bedstead to be unoccupied in the interval—and you will have banished the unwelcome intruders.

The Swedish turnips are frequently attacked by a small and most voracious insect, termed the "green fly." This insect is very hardy, and apparently furnished with many unwonted natural defences, which render the destruction of it, to say the least, difficult. Some have recommended to dust the fields affected with this pest with plenty of road dust, early in the morning, while yet the plants are wet with dew. Some say, use for the same purpose, lime, or a mixture of lime and soot, or soot and sulphur, or *guano*; but I need not enumerate remedies that I *know* to be *worthless*. All these remedies have been amply and impartially tried, and have all failed in producing the slightest effect. As to the formerly credited magical effects of guano, I presume I need say little or nothing. Rolling with a heavy roller will certainly destroy the fly, provided the roller be *heavy enough;* but I may add, for the information of such as would try the experiment, that it will as *effectually destroy the turnips* also. Others recommend employing children to remove the flies with a little brush. This would no doubt be very effectual, but it is very troublesome, and exceedingly *slow* in operation. The system of dragging the field with a cloth smeared with gas tar, as described in my last article, will be found one of the most simple and effectual modes of destroying the green fly that has yet been suggested; and if it should fail, let *fumigation*, as already described, be at once resorted to.

The green fly which attacks Swedish turnips is the *Aphis Brassica*. It also feeds on cabbages. The manner in which these flies are propagated is so singular, that I think my most practical readers will not deem a short account of it irrelevant or uninteresting. The females deposit their young enclosed in a little sac or capsule: in this capsule lie the young aphides perfectly formed, but they do not emerge from it until the following spring. When they appear, they are almost wholly females, with scarcely a single male to be seen with them during the whole spring and summer. If, in summer, a young aphis be taken from the shell, and kept apart from all communication with a male, it will nevertheless produce young, and so on to the sixth or seventh generation; but as autumn approaches, this singular fructification begins to lose its influence. The aphides cease to produce females only. Males are likewise brought forth, which immediately commence the business of impregnation, and this single commerce communicates fertility to their whole female posterity until the same time the following season. Allied to this is M

Smee's Aphis Vastator, from an interesting paper, of which the following is the substance:—

In consequence of the interest which is now attached to aphides, and the apparatus which they possess to commit their ravages upon plants, I have examined these organs in many species, and selected specimens, under different circumstances, from six species, that the anatomy of the part may be thoroughly illustrated.

The suctorial apparatus of aphides consists of a rostrum, which is placed on the under surface of the creature, and which is of various lengths in different species. This rostrum is grooved on its inferior surface, and is supposed, by comparative anatomists, to correspond to the inferior labium of other animals. In this groove lie three very fine setæ, or lancets, which are destined to pierce the cellular tissue, and thus enable it to suck the juices of the plant.

The lancets are extremely delicate, incomparably more so than those of most other creatures; they are attached or soldered at the upper part to a part which probably corresponds to the upper lip of other animals. These lancets, under the highest powers of the microscope, appear much smaller than the finest hair, and thus form one of the most beautiful microscopic objects possible.

In the groove of the rostrum these setæ or lancets lie, and are free at one end, and at the other are attached to a part which corresponds to the upper lip of animals. In examining various specimens, we perceive the various parts of which the rostrum is composed, and their mutual relation.

If we compare the exquisitely delicate apparatus of the aphis with those of other insects, we shall in some degree appreciate the minute character of the former. In the gad-fly the piercing apparatus is far coarser, and resembles in some respects the form of a bleeding lancet. In the tabanus the lancets most resemble those of the gad-fly, and are incomparably larger and coarser than the fine ones in the aphis.

When aphides are about to feed, they walk about and attempt to thrust the apparatus into the leaf, moving the rostrum up and down; but the operation seems to be effected with considerable difficulty. When it has pierced the leaf, it requires a second or two, if disturbed, to withdraw its lancets. If the insect be killed suddenly while feeding, the observer will find that it is firmly adherent to the leaf. In fact, when these destructive creatures have once fixed themselves, they remain in that position for long periods without moving, unless the plant becomes injured, and they desire to move away to other plants.

No persons of ordinary powers of observation could ever mistake the punctures of aphides for the bites of caterpillars, or the injuries of insects which live in the internal parts of the leaf, like the creatures which attack the leaves of the celery, the leaves of the holly, or those of other plants. The puncture of the aphis could scarcely be noticed were it not for the discoloration which almost immediately surrounds it, and the fungus which emanates therefrom; but even in this case observers have frequently mistaken various parts of plants for fungi. The growth of fungi almost invariably follows the punctures of the aphides. The celery leaves, after having been attacked, are generally followed by a fungus; rose leaves, sycamore leaves, groundsel, wheat, and in fact all other plants, are similarly affected after having been punctured by aphides.

I have now briefly described the lancets which constitute the suctorial apparatus of aphides. In numerous species which I examined, the same structure exists. I am also informed by Mr. De la Rue that the lancets of the coccus are exactly similar, but I have no species by me at the present time to refer to the matter.

Mangold wurzel is attacked by the larvae of the *Scarabæus Vacca*, and other troublesome grubs, millipedes, and worms; *the only* remedy for which that I know of is a [illegible] effective is, sprinkling powdered quick-lime in the drills, between the plants, and suffering it to be slaked by the natural action of the atmosphere. Fresh slaked lime, freely dug into the land previous to sowing, and the *steeping* of the seeds, as already described, will probably be also found useful in some cases; and when the pest makes its appearance on the leaf, I am of opinion that *fumigation* may be resorted to with effect. Many of these *grub* pests owe their origin to the use of *compost*, which frequently contains these larvæ to a considerable extent. Let there be, therefore, added to the compost, when it is conceived that the application of such is desirable, a proportionate quantity of salt, soot, and fresh lime.

I have frequently heard irrigation with *tobacco-water* recommended as a mode of extirpating these troublesome insect pests, and have, in many cases, personally proved its efficacy. Tobacco itself will, when the fly makes its appearance in *greenhouses* be found useful in *fumigation*. When used in *irrigation*, the strength recommended for the liquor is obtained by adding to the liquor itself, as procured from the tobacconist, four times its bulk of plain water. The mode of using it is, if the plants and pots are of such size as to admit of lifting them in the hand, to reverse them, and plunge the whole plant in the prepared liquid. If too large, to water them with it from a watering-pot, with a *rose* prepared for the express purpose, with *numerous holes*, and these of small size. Fumigation was effected by mixing tobacco leaves, previously *well dried*, with some sulphur and saltpetre, setting fire to the mass rolled up in paper, and then carefully shutting close all doors and windows. Of course I need not warn you to get yourself *outside* the greenhouse, before you take the latter precautions, unless you desire to share the fate of the fly you are *endeavouring to* destroy. This mode of treatment is also *said to prove* effectual in destroying the gooseberry caterpillars; as is also previously watering the bushes, and then sprinkling copiously with road dust; also, watering with lime water.

I have tried, and with success, [illegible] diluted sulphuric acid upon chloride of lime, and when [illegible] acid cannot be procured, hot water will be found to answer. This is a valuable fumigator. The most certain, however, is *orpiment*, as already described.

THE RED SPIDER is not by any means to be omitted in speaking of our insect pests; it is particularly destructive to *pines*. To extirpate it, I need only recommend the same mode of treatment as that employed for the destruction of the green fly, viz.:—watering with lime-water, or tobacco-water; some speak of watering with sulphur in water. Sulphur may almost be said to be *insoluble in water*, for the quantity of it taken up by a gallon of water is so exceedingly minute as to be inert, unless, indeed, we are to go to work upon the Homœopathic system of infinitesimal doses—in this case, if this system be proved true, sulphur in water may be found serviceable, but in no other. Watering with lime-water, will also prove an effectual remedy for *worms* which, although, to a considerable extent, actually rather beneficial to the farmer than otherwise, in loosening the soil, and raising the subsoil to the surface; still, when suffered to exist in an inordinate quantity, will *consume* more vegetation than could ever be compensated for by their utility, were it even tenfold greater than it is. I may here add, that in order to prepare lime-water for these or any other purposes, it is only necessary to put a few lumps of quick lime, over night, into a barrel of water—*soft* or river water answers best—and it will be fit for use the next morning.

This remedy has also been recommended for the destruction of slugs and snails, but I have had no reason to answer for its efficacy in this case. The most effectual mode of getting rid of these very great pests, is to employ children in picking them off the plants, immediately after rain. You can stimulate your little labourers to extra industry in the work of collection, by offering them a small sum per hundred; and here let me observe that you must not trust to *drowning*, as a mode of putting your snails or slugs to death, after they have been collected; water will be found to do them no injury, and they will deliberately crawl out of any pond into which you may throw them, rather invigorated than otherwise, by their, to them only refreshing, cold bath. Neither are you to trust to *crushing them*—I am sorry to say that you must, in this instance, lay aside much of your humanity, and act in a manner that must prove repugnant to the feelings of every humane man—you have nothing for it but collecting the snails and slugs in a barrel or large tub, and pouring boiling water upon them—in fact, *scalding* the poor wretches to death. You cannot, however, help this, and recollect that not only is the summary destruction of these animals perfectly legitimate, but that this mode of destruction is one of the speediest and least painful that you could adopt. You are also on no account to suppose that the amount of pain experienced by those animals who occupy so low a position in the scale of creation as the Mollusca, of which the slug and snail are members, is to be measured by what you might conceive the sufferings of a human creature placed in similar circumstances. I have already called the attention of the reader to the value of *quick-lime* as a means of destroying snails on *walks* in the neighbourhood of hedges. He will find it effectual.

Beetles and Cockroaches (*Blattæ*), are often great nuisances, and extend their annoyance from the field, even to *the dwelling* of the farmer. It is at night that these very *nasty creatures* come forth. I have seen several sorts of trap sold for the purpose of taking them, but prefer, in this instance, *poison*, because the dose required for their destruction will be so very minute, as to be innoxious to other creatures, for whose safety we might otherwise feel uneasy. Corrosive sublimate, dissolved in spirits of wine, and a feather used to touch bits of potato with the solution, which, being placed in the haunts of these insects over night, will be found to destroy hundreds. In order, however, to avoid the possibility of accident, let the poisoned baits be carefully removed every morning and laid aside until the next night. Spirits of turpentine laid in their haunts is also said to banish them. The best mode of using it is, to dip bits of sponge in the turpentine, and scatter them about under the grate, under presses, and behind trunks or chests, &c.

Moths are destructive to many plants, but particularly in a house, to clothes, &c. Musk and camphor are the only remedies I know of, and I am by no means disposed to vouch for their thorough efficacy.

Hornets and Wasps are very destructive to fruit, and to apiaries, consequently they rank among the "Pests of the Farm," although not directly destructive to any, strictly so called, agricultural produce; though I sincerely hope that honey may soon be so generally cultivated as to be deemed such by every farmer throughout our British islands. The Wasp and Hornet inflict likewise a very painful sting, which has been even known to produce death; and scripture readers will doubtless recollect that these insects were once, of olden time, made use of by the Almighty, to chastise a powerful and warlike people, who were actually worsted in the contest.

The natural history of these insects is so very interesting, and will also throw so much light on the most effectual methods to be employed in their destruction or extirpation, that I shall, I think, scarcely be called on to apologise for entering into it. Wildman calculates that a single wasp's nest breeds upwards of 30,000 wasps in a single year!

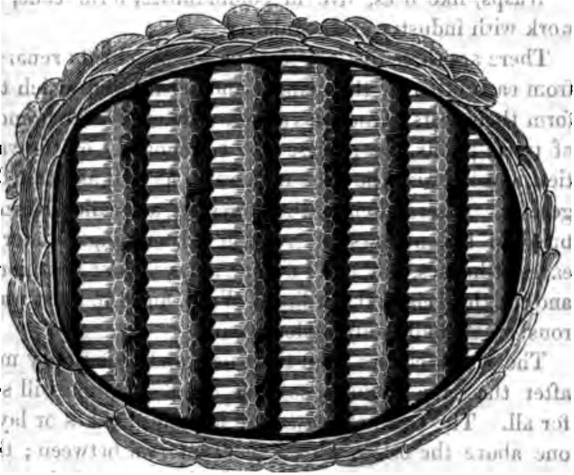
What then would become of us if we hesitated to take active measures for checking their increase.

Wasps, like bees, live in communities, form cells, and work with industry and regularity.

There are three distinct sorts of wasps, chiefly separated from each other by the manner and position in which they form their nests. One class attaches themselves to branches of trees, plants, &c.; these are the smallest of the varieties, and likewise the least numerous, as well as least dangerous. A second class, the largest of all, called Hornets, build in the hollows of trees, in old buildings, under the eaves of houses, but, at all events, always under *some cover;* and the third class, the ordinary Wasp, and the most numerous of all, build only under ground.

The three classes form their nest and cells pretty much after the same fashion, so that one description will serve for all. The nests of wasps are formed of cakes or layers, one above the other, with a small interval between; those cakes nearest the bottom being the largest, and those near the top the smallest, giving a pyramidal form to the structure. The cells are, like those of bees, hexagonal, or *six sided,* but are not formed of *wax.* The approach from the surface of the ground to a nest of the community of wasps, is about an inch in diameter, and gradually widening. Sometimes the nest is far under ground, and sometimes comparatively near the surface. The nest is covered between its sides, and the hole in which it is buried, with a substance resembling *paper,* of an ash-grey colour, and coarse rough texture. I should add, that there are two avenues leading to each nest—one for ingress, and the other for egress. This avoids confusion and quarrels, for the wasp is a very irritable and savage insect, and by no means of a *temper to put* up with *jostling* or *bustling.*

The cells are formed also of this sort of paper, and are *formed on one side* of the cake only, unlike those of bees, which are formed on both surfaces. Those cells contain neither honey nor wax, being used only for lodging eggs



and larvæ. The cakes are connected together by columns of the same paper-like material, in numbers proportioned

to the diameter of the cakes they are required to support between the very large cakes, therefore, they present the appearance of a colonnade.

Like the bees, the inmates of each nest are of three kinds or sexes, which may be called *females*, *males*, and *mules* or *neuters*. The females are the rulers, but they are not, as in the case of bees, limited to a single monarch in each nest—they often exist in it to the number of upwards of two hundred. The male wasps represent the *drones* in the hive, and the mules the common bees or workers.

The mules are employed in building and in foraging for the food of the remainder of the community. Those not employed in building are the foragers. They attack bees and other insects, and convey them, sometimes entire, sometimes only their dissevered paunch, to the nest; others pillage butcher's shops or fruit. On arriving at the nest, they are eagerly surrounded by the males and females, and speedily relieved of their burdens. There is, however, no rioting—each takes his or her share, and is satisfied with it until next arrival. *Fruits* are not carried to the nest, but their juices are, in the form of a *nectar*, which is prepared within the body of the wasp, and is ejected from his mouth on his return to the nest. The female wasps are the largest and heaviest; the males next in size; and the hard-working mules the smallest.

During the months of June, July, August, and the beginning of September, the mother wasps keep to the nest, and are employed in laying their eggs and feeding their young. Impregnation takes place in the latter end of September, and in October; and next spring the mother wasp commences her nest. She has no further occasion for her consorts, who have consequently perished in multitudes during the winter.

Now, as to destroying Wasps and Hornets, we have only *to recollect that* mules and males are destroyed by the *winter's frost; that* many of the females likewise perish and that the following spring and summer, each female becomes actually the founder of a vast republic. It will then be at once seen, that in order to exterminate the entire race of wasps, we have only to destroy these few females at the proper season.

The females begin to come forth early in spring; generally about April, at which time, their usual food, flies, being scarce, they are very ravenous for food, and will eagerly seek after it. Take advantage of their necessities. Put honey mixed with beer, or ale, into phials or bottles, and suspend them on such trees as are in bloom. You will thus entrap many mother wasps, and every one thus drowned will reckon as a colony destroyed. It is also a very good plan to offer a bounty of a few pence per head, for every mother wasp brought in from the end of January to the end of April: after this period the nests have been formed and the mischief done past remedy.

You should likewise destroy the nests wherever you can discover them. Those which build under ground are easily disposed of, by introducing as far as you can into the holes, a *devil*, or *squib*, made of damp gunpowder. Cover the exterior with straw, and setting fire to it the flame will extend to the gunpowder, by means of a *train* previously laid. The nest should be dug up in about twenty minutes, and may as well be thrown into a tub of water, lest any hardy wasp should have escaped, which, however, is not very probable.

The Hornet's nests cannot be thus attacked, in consequence of the situations in which they are built, still they may readily be destroyed in the following manner:—Their nest is usually formed of a *bottle shape*, suspended in its position by a *narrow neck*; slip a bag over it from below, up to the neck, draw the string suddenly, and wrench the nest from its place, you will thus have the nest, inmates and all, enclosed in the bag, and by immersing it in water, you can, at one swoop, destroy the whole colony. Take care keep hold of the bag by the mouth only; if you put your hand on any other part, you will be sure to be stung. The destruction of the Wasp's nest should be undertaken only in the evening, when the inhabitants shall have all retired for the night, or on a rainy day; and I would also be disposed to recommend similar precautionary clothing to that used in manipulating with bees, viz.:—a muslin overall, gloves, veil, and to sprinkle the person with creozote mingled with water. Have with you, also, a small bottle of *aqua ammoniæ*, which will be found a valuable specific, in the event of your receiving an accidental sting.

House flies are a very great nuisance, especially in a warm summer. Although not strictly a pest of the *farm* in particular, they are so very general a plague, that a few words may not be thrown away, in describing a mode of destroying them.

I object, as I have already stated in various passages of this volume, to the use of *poison*, whenever it can be avoided; and when compelled to resort to it, I would always endeavour to employ such as, while proving fatal to the pests we desire to extirpate, will at the same time, not prove fatal to animals of larger size, or different constitutions. I should, therefore, by no means be disposed to recommend *fly powders*, composed of *King's yellow*, *arsenic*, &c., but will recommend two harmless, and equally efficacious preparations.

1. Boil a few chips of quassia for five minutes, in as much water as will barely cover them; leave this water in saucers, or on plates, being previously mixed with sugar.

2. Take black pepper, coarse brown sugar, moisten with milk, lay it on plates. This last mixture will not kill the flies on the instant, but the day after you have begun to use it, you will find the flies dropping down in all directions, and *dying*. *These* remedies will be found thoroughly efficacious, *and will* assuredly be preferred to less certain and highly *dangerous poisons*, which may kill a dog, cat, or even child.

For Weevils and Beetles in granaries, where these insect frequently do a surprising amount of mischief, I would recommend the use of the *phosphoric mixture* described in a former article; they will eat it with avidity, and it will destroy them as effectually as it does rats.

I now come to speak upon a subject which, though deeply interesting to the farmer, nay, to nearly every one, will, perhaps, excite some surprise when found classed amongst the *living* Pests of the Farm. I allude to *mange* and *scab* in the dog, the sheep, the ox, the hog, and the horse; for the disease is radically the same in all these animals, however apparently circumstances may combine to change or modify its aspect. The mange is produced by the ravages of a minute insect known to zoologists as the *Acarus Scabiei*, or Mange Fly.

It may be asked, how does it happen that low or high feeding, carried to an extreme, will produce mange? I deny that such treatment will have the effect, unless combined with *filth*; indeed, want of due attention to cleanliness may be said to be almost the only proximate cause we can adduce for the appearance of this very loathsome malady.

The *Acarus Scabiei* being a microscopic animal, I need not detain my readers with any dissertation on its natural history; nor need I enter upon the investigation as to whether or not the various sorts of mange are produced by various descriptions of fly. It must suffice to detail the different aspects assumed by the disease, and to state a certain mode of cure for each.

There are three sorts of mange, and they are not, as many suppose, merely three distinct stages of the same disorder, but essentially different from each other. The common mange every one is acquainted with; it is strictly analogous to itch in the human subject, and like that disease, is a usual concomitant of uncleanliness, and is *infectious to a degree.* It is likewise communicable to mankind *by unguarded* contact with the afflicted animal, and whe thus acquired, is far more difficult to eradicate than if it had derived its existence from merely human contamination.

The scabby mange presents an appearance of large blotches or sores. It is very common in old dogs; and when an attendant on extreme old age, is not, indeed, worth the trouble of an attempt to cure. The best remedy in such cases would be to destroy, by a summary proceeding, at once the afflicter and the afflicted.

The third variety of mange to which I would advert is the *red mange*. This disease exhibits itself in a general redness over the affected parts, which subsequently extends even to the coats. This latter appearance is more particularly observable in *white* animals. In *red mange*, the hair does not strip off so rapidly or extensively as in the other varieties, and its seat is usually—unless, indeed, in very extreme cases—confined to the lower part of the back and rump, the breast, belly, and inner surfaces of the legs, both fore and hind. The following will *never fail* of effecting a cure:—Take of common yellow flour of sulphur one ounce; of nitrate of potass (nitre), one drachm; pound these substances together in a mortar, until they are intimately united, and give of the powder thus procured a quantity proportioned to the size of the beast under treatment, every morning before feeding, for one week. In order to supply my readers with some sort of guide as to the quantity to be administered at a dose, I may add, that to a Newfoundland dog or mastiff dog, you should give an ordinary table-spoonful. At the end of one week, say on the eighth day, instead of your powder, give a pretty strong dose of same purgative. I recommend a combination of calomel with aloes. Your next step must be to wash the animal from head to foot in tepid water, with *soft soap*—it *is no great matter* whether you remove the soap afterwards *or not; but you* must have your patient rubbed thoroughly *dry. Need I* say that the bed should also have bee changed; nay, if you could remove the animal for a time to another house or kennel, it would be no small advantage.

Now obtain the following ingredients:—

Train Oil,	1½ pint.
Spirit of Turpentine	2 ounces.
Oil of Tar	1 ounce.
Naptha	1 ounce.
Soot	
Flour of Sulphur	

Let the proportion of the soot be one-eighth of the sulphur, and let the latter be, with the assistance of the former, just in sufficient quantity to bring the mess into the consistence of ordinary porridge. When you have carefully mingled these ingredients, which should not be done until you require to use them, as some of them are very volatile, let them be used as an unguent to every part of the animal, avoiding, of course, the *eyes*, the *anus*, *pudenda*, or other tender surfaces. Leave this on the beast for about from three to four days, during which time you must have kept your patient carefully housed and protected from cold, especially from draughts or currents of air. You then on the fourth or fifth day, according to the mildness or virulence the malady had exhibited, carefully wash the animal as before, and on this occasion you may add a portion of soda, or soap ley, to the water, in order to remove the soap; change the bedding again, and in less than a week you will find your patient sound and clean, and will have the satisfaction of witnessing the incipient but rapid growth of a new and improved coat.

As to *diet*, I think it has little to do with the origin of the disease, but it certainly has considerable connexion with its subsequent existence. I would recommend light diet, not given in too large quantities at a time. Recollect that your patient is now deprived of his accustomed exercise, and of course his digestive powers have less occasion for a demand upon them; and every ounce of food dissolved in the stomach, over and above what is required for assimilation, forms the germ of disease: although its access may be deferred, it will prove no less certain.

TICS are frequently very troublesome, and they adhere with such pertinacity—having their snouts also buried in the skin—that it is not always easy to get rid of them. Washing with soft soap, and not afterwards removing it, will be found insufficient to effect a cure, though recommended with much confidence by some. Poisonous washes have been favourably spoken of, but I object to them, on the ground of their occasionally proving fatal to the animal they are designed to relieve, by being absorbed into the system through the medium of sores or abrasions.

1 pint of Train Oil,
2 ounces of Spirit of Turpentine,
1 ounce of Oil of Tar,

rubbed over the animal; if a *sheep*, the coat should be removed, and after being suffered to remain on for a couple of days, wash off with soft soap and water. If the *fleece* be not very much *tagged*, it need not be removed, and the Tics can afterwards be got out of it by combing with a horse comb.

FLEAS—a pest of the farm-offices, nay, of the farm-*house*, that might gladly be dispensed with. In dog kennels or barns afflicted with these insects, you will find a bed of *deal shavings* answer the purpose. If they attack you in *your own bed*—do not start, we know how audacious they are—you may banish them by laying, between the palliass and feather bed, a quantity of *wormwood*. This I have found an effectual remedy. Of course, I need not add, cultivate cleanliness, and make free and frequent use of the whitewash brush.

THE END.